

# FY 2012 SUMMARY OF PERFORMANCE AND FINANCIAL INFORMATION





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### Front Cover:

Outside Front Main Image:

Curiosity Landing Site Panorama, with the Heights of Mount Sharp, Mars. (Credit: NASA/JPL-Caltech/Malin Space Science Systems (MSSS))

Outside Front Bottom Images (left to right):

MSL lifts off from Cape Canaveral aboard a United Launch Alliance Atlas V. (Credit: NASA/Scott Andrews/Canon); Curiosity Approaching Mars, Artist's Concept. (Credit: NASA/JPL-Caltech); Curiosity's Sky Crane Maneuver, Artist's Concept. (Credit: NASA/JPL-Caltech)

Inside Front:

Space Shuttle Discovery Flown Over the U.S. Capitol (Credit: NASA/Smithsonian Institution/Harold Dorwin)

### Rear Cover:

Inside Rear: The International Space Station. (Credit: NASA)

Outside Rear: Self-Portrait of Curiosity by Rover's Arm Camera. (Credit: NASA/JPL-Caltech/MSSS)



# Message from the Administrator

February 15, 2013

I am pleased to present to you the National Aeronautics and Space Administration's (NASA) fiscal year (FY) 2012 Summary of Performance and Financial Information. In this report, we share the Agency's financial and programmatic performance highlights over the past 12 months. I fully understand the public's expectation for transparency and stewardship from our Government; this document reports back to you, the American people, to the President of the United States, and to Congress, NASA's accomplishments and stewardship of the resources entrusted to the Agency.



In 2012, NASA celebrated the pioneering Americans who decades ago planted our Nation's flag on the surface of the Moon. The Agency's daring spirit of adventure and discovery, exemplified in its past pioneers, remains fervent and undiminished in 2012. Looking to the future with great expectations, NASA's achievements provide inspiring evidence that the Agency is once again on the brink of a new era in space exploration. In August 2012, we celebrated the landing of the aptly named Curiosity Rover on the surface of Mars. NASA's people continue to work as tirelessly as they worked to guide the successful landing of Curiosity to inspire the next generation space scientists and explorers to carry on NASA's mission for the Nation.

The end of the Space Shuttle program this past year brought about a concern for NASA's future. As I said on July 1, 2011, America's leadership in space will continue for at least the next half-century. Our shift toward increased commercialization of space flights frees NASA to pursue its bold mission of human exploration beyond low earth orbit and ultimately land humans on Mars. This shift is well under way; the Dragon spacecraft completed the first commercial resupply mission to the International Space Station (ISS) in May 2012. Working with the U.S. commercial space industry provides safe, reliable, and cost-effective crew and cargo transportation to the ISS and allows NASA to focus on developing the new Orion Multi-Purpose Crew Vehicle and the Space Launch System to carry future astronauts farther into deep space than we have ever been. This year, NASA delivered the crew module to Kennedy Space Center on July 2, 2012, in preparation for a fiscal year 2014 demonstration mission.

In addition, we are continuing a robust portfolio of over 1,000 research and technology investments that will boost the Nation's capability to operate more efficiently in space and enable long-term, cost-effective deep space exploration. These investments include numerous high-value technology projects that are not currently commercially feasible, but hold great promise for our space exploration programs and commercial uses yet unknown.

We are proud of our progress this year, both in our program accomplishments and in the way we have managed our resources to efficiently deliver on our commitments. I encourage you to read

the Performance section of this report to learn more about our program activities. I also encourage you to read the Financial section to get a better understanding of how we are managing our resources – your tax dollars. This AFR provides an integrated picture of the relationship between our financial stewardship and programmatic accomplishments. It also includes reports from independent auditors and the Inspector General. These independent reports highlight opportunities for improvement as we strive to continue to do better.

NASA makes every effort to insure that performance data are subject to the same attention to detail as is devoted to our scientific and technical research. With this in mind, I can provide reasonable assurance that the performance data in this report are reliable and complete. Any data limitations are documented explicitly in this report.

In addition, NASA accepts the responsibility of accounting for and reporting on its financial activities. During FY 2012, NASA received an unqualified “clean” opinion on its financial statements. This is the second year in a row that NASA has received an unqualified opinion. NASA continues to be in substantial compliance with the Federal Financial Management Improvement Act. Based on the results of this year’s efforts, I am able to provide reasonable assurance that this report’s financial data are reliable and complete.

We are proud of the strides we made this year in our programs and in our management of the Agency’s resources. For those seeking additional details regarding our performance and progress towards achieving our Strategic Goals, I invite you to read our Annual Performance Report, which will be released with the Congressional Budget Justification in early 2013.

We are excited to be part of this new age of space exploration and discovery. The discoveries we are making are re-writing textbooks and inspiring the next generation who want to make their own discoveries. As we begin a new fiscal year, we will continue our steady pace toward achieving our Strategic Goals. We look forward to sharing our new discoveries in the year ahead with the American people.

A handwritten signature in dark ink, appearing to read "C. Bolden, Jr.", with a stylized flourish at the end.

Charles F. Bolden, Jr.  
Administrator

## Message from the Office of the Chief Financial Officer

February 15, 2013

The National Aeronautics and Space Administration is firmly committed to delivering the highest standards of financial accountability, transparency and reporting in support of the nation's aeronautics and space mission. Our Summary of Performance and Financial Information is an important component in documenting and meeting those standards. In this summary, the Agency discloses and reports on our key performance and financial outcomes for the fiscal year.



As Administrator Bolden makes clear in his Message, the complexity, diversity and sheer volume of NASA's Mission portfolio continues to grow as NASA enters a new era of space exploration, commercial partnerships and scientific research. The goals and performance results described in this summary help to describe and explain how NASA is meeting these exciting challenges. The summary also describes how NASA's financial management requirements have necessarily evolved and grown to support this increasingly varied and complex mission and program environment. More than ever, it is vitally important that our financial systems and processes provide NASA leadership and program officials with the right information at the right time to make the most cost effective operational decisions. I invite you to read our full Agency Financial Report for highlights of our 2012 performance and to better understand this intersection of NASA's program and financial management. More detailed performance reporting will be available in our Annual Performance Report, to be released in the 2014 Congressional Justification.

I am proud to report that NASA, for the second year in a row, received an unqualified or "clean" opinion on its financial statements. Clearly, we have continued to build on our prior year results as we enhance and improve our financial management processes and activities. Additionally, the Agency maintains a robust system of financial and operational controls overseen by senior leadership. The Agency is able to report that it is substantially compliant with the Federal Financial Management Improvement Act (FFMIA) for fiscal year 2012.

We are pleased with our continued progress and achievements, and remain committed to ensuring sound financial management. I appreciate the continued support of the entire Agency, with special thanks to the Office of Inspector General, as we continue to work together in our quest for excellence in financial management.

A handwritten signature in blue ink, which appears to read "Elizabeth Robinson".

Dr. Elizabeth Robinson  
Chief Financial Officer

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Photo (above): Endeavour and Atlantis come nose-to-nose while being moved from and into processing, respectively  
(Credit: NASA)





Photo (above): Endeavour and Atlantis come nose-to-nose while being moved from and into processing, respectively  
(Credit: NASA)

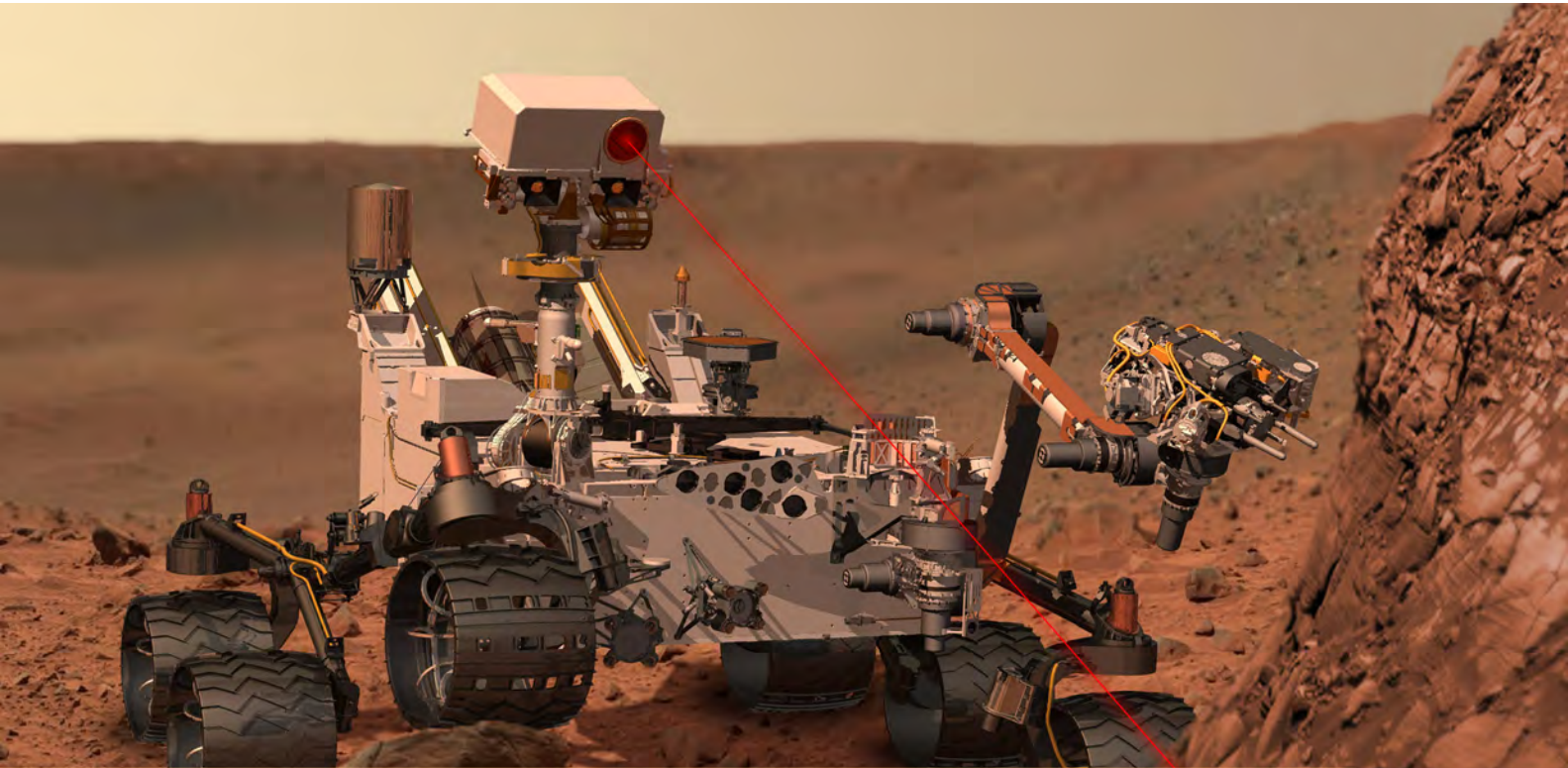
# Welcome to NASA



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Photo (above): Space Shuttle Enterprise and the Empire State Building, New York City, New York; Space Shuttle Endeavour and the Golden Gate Bridge, San Francisco, California; and Space Shuttle Discovery and the National Mall, Washington, DC. (Credit: NASA). Photo (opposite): MSL-Curiosity fires its ChemCam instrument laser at a rock in this artist's depiction. (Credit: NASA)





# Introduction

The fiscal year 2012 (FY 2012) Summary of Performance and Financial Information (SPFI) summarizes the Agency Financial Report (AFR), which provides a review of NASA's major programmatic and financial results for FY 2012. The AFR integrates financial and program performance to demonstrate NASA's stewardship and accountability.

This summary document highlights our achievements in FY 2012 and points to the financial and programmatic challenges and opportunities facing the Agency in the years ahead and management's efforts to meet them. The SPFI describes NASA's successful landing of Curiosity Rover on Martian soil on an extraordinary space science mission to understand the Martian environment, which is one element of NASA's bold mission of deep space exploration and, ultimately, landing humans on Mars. Also highlighted is the successful Space Exploration Technologies (SpaceX) flight to the International Space Station (ISS), the first private sector resupply mission to the ISS. This points to strong future private sector space-flight related industries now being nurtured with NASA's resources and scientific research. As NASA prepares for deep space exploration

beyond low earth orbit, in addition to technological and scientific difficulties, the Agency must balance budget requirements in an environment of other competing national priorities. This is a serious challenge that the programmatic and financial communities will work together to address.

The AFR provides more details about how NASA demonstrates stewardship and accountability through compliance with the Chief Financial Officers' Act (CFO Act), Government Performance and Results Act (GPRA, as amended), and the Federal Financial Management Improvement Act (FMIA). NASA accounts for its financial activities according to a set of generally accepted accounting principles applied by the Federal Accounting Standards Advisory Board. The Financial Section of the AFR shows the net cost of our operations by both major programs and the Agency as a whole to help the stakeholders understand the connection between resource use and program accomplishment.

The AFR describes our system of checks and balances, as required by Office of Management and Budget's (OMB) Circular A-123, which



places responsibility on management to establish controls to safeguard assets and improve efficiency of operations. The AFR also presents NASA's audited financial statements and the independent auditor's financial audit opinion for readers to better understand the financial condition of the agency.

[Click here for the 2012 Agency Financial Report.](#)

## Mission and Vision Statement

NASA was created by the National Aeronautics and Space Act of 1958 to provide for research into problems of flight within and outside the Earth's atmosphere and to ensure that the United States conducts activities in space devoted to peaceful purposes for the benefit of mankind. In 2010, the President unveiled an ambitious new direction for NASA, laying the groundwork for a sustainable program of exploration and innovation. Called the National Space Policy, this direction extends the life of the International Space Station (ISS), supports the growing commercial space industry, and addresses important scientific challenges. It also continues NASA's commitment to robust human space exploration, science, and aeronautics programs. Later in 2010, Congress passed the NASA Authorization Act of 2010, which provided the Agency important guidance on program content and conduct.

On February 14, 2011, NASA released a new Strategic Plan that embodies the spirit, principles, and objectives of this and other recent policies and legislation. The plan introduced a new framework for NASA's strategic direction and included the following Vision and Mission statements:

- To reach for new heights and reveal the unknown, so that what we do and learn will benefit all humankind; and



A cutaway of the Orion Multi-Purpose Crew Vehicle (MPCV). The crew module is shrouded inside the Launch Abort System atop the service module. (Credit: NASA)

- Drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.

## Overarching Strategies

**Investing in next-generation technologies** and approaches to spur innovation;

**Inspiring students** to be the future scientists, engineers, explorers, and educators through interactions with NASA's people, missions, research, and facilities;

**Expanding partnerships** with international, intergovernmental, academic, industrial, and entrepreneurial communities and recognizing their role as important contributors of skill and creativity to NASA's missions and for the propagation of NASA's results;

**Committing to environmental stewardship** through Earth observation and science, and the development and use of green technologies and capabilities in NASA missions and facilities; and

**Securing the public trust** through transparency and accountability in NASA's programmatic and financial management, procurement, and reporting practices.

## Organization

The overarching strategies defined in the 2011 Strategic Plan govern the management and conduct of NASA's aeronautics and space programs.

Each organization uses these strategies in developing and executing its plans to achieve the Agency's strategic goals and annual performance plan. The strategies also provide a framework that guides NASA's support for other areas of national and Administration policies.

NASA's mission is organized into three core programmatic Mission Directorates, one Mission Support Directorate, and three additional Offices, through which it implements its science, research, and technology development programs and manages its operations.

**Aeronautics Research Mission Directorate (ARMD)** conducts foundational research into early-stage concepts and ideas, develops new technologies and operational procedures and demonstrates the potential of promising new vehicles, operations, and safety technology in relevant environments. ARMD's cutting-edge research yields technologies that overcome a wide range of aeronautics challenges for the Nation's current and future air transportation system.

**Human Exploration and Operations Mission Directorate (HEOMD)** is responsible for human and robotic space exploration. HEOMD operates the International Space Station and develops technologies and capabilities for human exploration beyond low Earth orbit. It manages the commercial crew and cargo development programs, construction of the Orion Multi-Purpose Crew Vehicle, development of a new heavy lift rocket known as the Space Launch System, launch operations, space communications, rocket propulsion testing, human health and safety, and exploration technology development.

**Science Mission Directorate (SMD)** conducts the scientific exploration of the Earth, Sun, solar system, and universe. Its strategies include

ground-, air-, and space-based observatories; deep-space automated spacecraft; planetary orbiters; Landers; and surface rovers. It also develops innovative science instruments and techniques.

**Mission Support Directorate (MSD)** provides efficient Agency-level management support of programmatic Mission Directorates. It includes Headquarters and Centers' management and operations, facility construction, budget and finance, information technology, human capital management, and infrastructure. Organizing mission support services into a Mission Directorate ensures shared management practices across the Agency and provides maximum visibility for management support services inside and outside the Agency.

**Office of Education (Education)** develops and manages a portfolio of educational programs for students and teachers at all levels. Education seeks to develop a vibrant pool of future workforce for sustainable support of national and NASA mission by attracting and retaining students in STEM disciplines, and raising public awareness of NASA's activities. To achieve these goals, Education works in partnership with other government agencies, non-profit organizations, museums and the education community at large.

**Office of the Chief Technologist (OCT)** is the principal adviser to the Administrator and advocate on matters concerning agency-wide technology policy and programs. OCT manages

NASA's Space Technology programs and coordinates and tracks all technology investments across the Agency.

**Office of the Chief Scientist (OCS)** is the principal adviser to the Administrator and advocate on matters concerning Agency science programs, strategic planning, and the evaluation of related investments. OCS ensures scientific endeavors are aligned with and fulfill the Administration's science objectives.

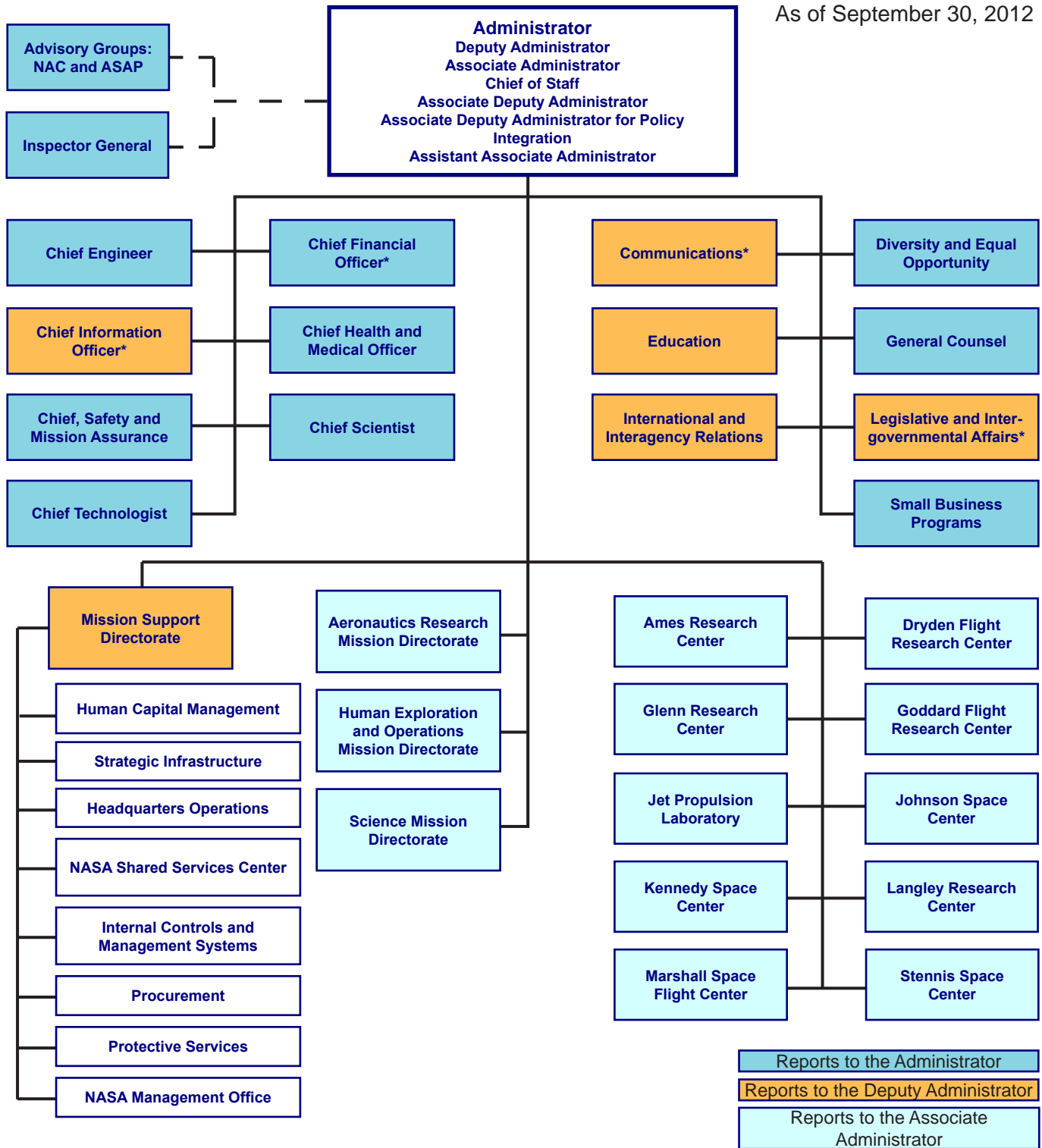
The **Administrator's Staff Offices** support the Administrator's administrative responsibilities by providing a range of high-level guidance and support in critical areas like safety and mission assurance, technology planning, education, equal opportunity, information technology, financial administration, small business administration, international relations, and legislative and intergovernmental affairs.

Administratively, NASA is organized into one Headquarters Office located in Washington, DC, nine operating Centers located across the country, and the Jet Propulsion Laboratory, a federally funded research and development center operated under a contract with the California Institute of Technology. NASA works in partnership with academia, the private sector, state and local governments, other Federal agencies, and a number of international organizations to support and achieve its mission.



# Organizational Structure

As of September 30, 2012



\*Center functional office directors report to Agency functional Associate Administrators. Deputy and below report to Center leadership. Dashed lines indicate independent organizations that report to the Administrator. Visit [http://www.nasa.gov/about/org\\_index.html](http://www.nasa.gov/about/org_index.html) for staff names and links to the associated offices.

## Centers and Facilities Nationwide



### Other NASA Facilities (noted by numbers on map)

- 1) Plum Brook Station, Sandusky, OH managed by GRC
- 2) Software Independent Verification and Validation Facility, Fairmont, WV managed by GSFC
- 3) Goddard Institute for Space Studies, New York, New York managed by GSFC
- 4) Wallops Flight Facility, Wallops, VA managed by GSFC
- 5) White Sands Test Facility and Space Network, White Sands, NM managed by JSC
- 6) Michoud Assembly Facilities, New Orleans, LA managed by MSFC

## Workforce

As of the end of FY 2012, NASA employed more than 18,500 civil servants, including full-time, part-time, term appointees, student and other non-permanent workers at nine Centers, Headquarters, and the NASA Shared Services Center. In addition, approximately 5,000 additional workers are employed at the Jet Propulsion Laboratory, operated by the California Institute of Technology. To see more information about workforce profile and distribution, visit the Workforce Information Cubes for NASA at <http://wicn.nssc.nasa.gov/>.

This year, the Office of Human Capital Management (OHCM) released a Workforce Plan that outlines the policies, procedures, and structures necessary for ensuring that critical workforce skills and capabilities are available and effectively used to implement the Agency's mission. The overarching goals of the 2012 Workforce Plan are to identify, acquire, and sustain the workforce necessary to conduct NASA's current and future missions. The Workforce Plan has five goals:

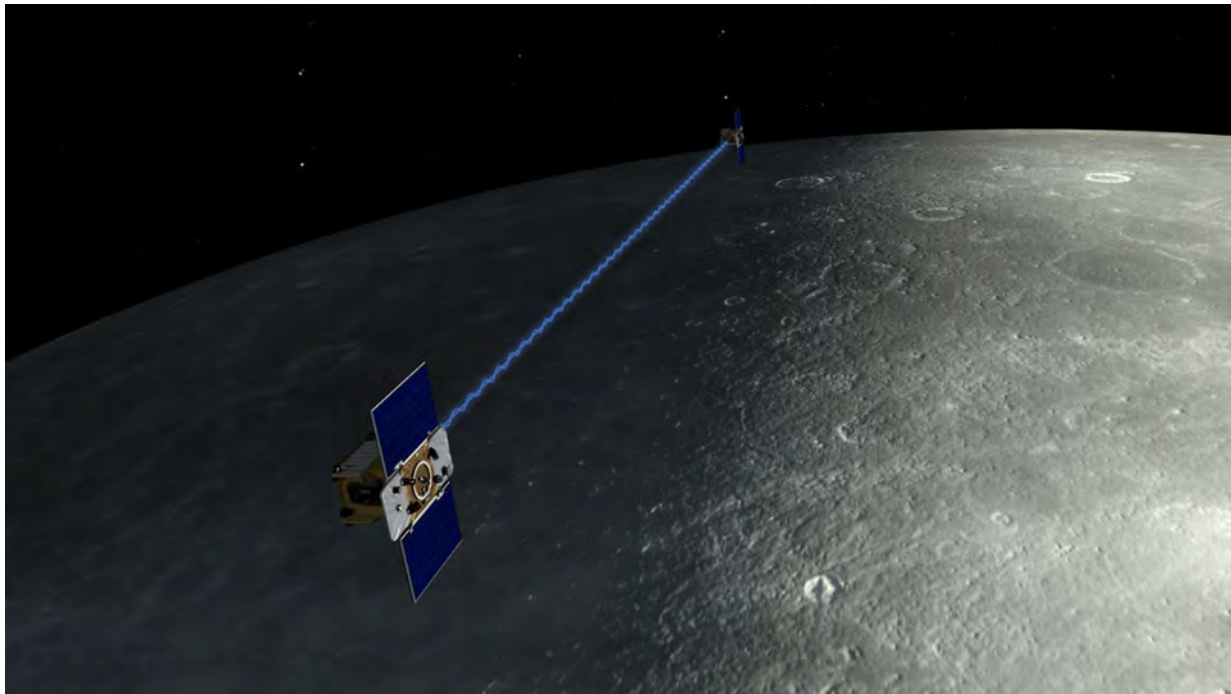
- **Workforce Goal 1:** Develop strategic human capital and position plan for mission success—analyze, develop policy, conduct organizational design and resource alignment to guide NASA's multi-sector workforce.
- **Workforce Goal 2:** Recruit and retain a highly qualified, diverse workforce—identify, recruit, and retain a diverse workforce with the right skills, at the right time, at the right place.
- **Workforce Goal 3:** Train and develop talent—Develop and conduct training and employee development initiatives that address today's and tomorrow's workforce requirements to enable mission success.
- **Workforce Goal 4:** Sustain a high-performing workforce—enable managers to sustain an environment conducive to workforce productivity, innovation and effectiveness.
- **Workforce Goal 5:** Enable efficient human capital services—develop effective human resources programs supported by comprehensive, timely, and reliable information.

OHCM will revise the Workforce Plan periodically to support NASA's evolving strategic direction, priorities, and workforce needs.



The Mars Science Laboratory (MSL) team in the MSL Mission Support Area react after learning the Curiosity rover has landed safely on Mars and images begin to arrive at the Jet Propulsion Laboratory, Sunday, August 5, 2012 in Pasadena, California. (Credit: NASA/Bill Ingalls)





From March 1 to May 29, 2012, the twin GRAIL spacecraft, Ebb and Flow, worked together to map the Moon's gravitational field. The mission entered its extended phase on August 30, 2012. Without the two spacecraft working in tandem, the mission could not have been completed. (Credit: NASA/JPL-Caltech/MIT)

## Shared Values Shared Results

NASA's tradition of excellence is rooted on the four uncompromising shared core values of safety, integrity, teamwork, and excellence, as well as the firm belief that failure is not an option.

**Safety:** Constant attention to safety is the cornerstone of mission success. NASA is committed, individually and as a corporate team, to protecting the safety and health of the public, NASA team members, and the assets that the Nation entrusts to the Agency.

**Integrity:** NASA is committed to maintaining an environment of trust, built on honesty, ethical behavior, respect, and candor. Agency leaders enable this environment by exemplifying, encouraging, and rewarding a vigorous, open flow of communication on all issues, in all directions, and among all employees without fear of reprisal. Building trust through ethical conduct as individuals and as an organization is a necessary component of mission success.

**Teamwork:** The most powerful force behind NASA's mission success is a multi-disciplinary team of diverse, competent people across all NASA Centers and Headquarters. Teamwork at NASA embodies the belief that each team member brings unique experience and important expertise to project issues. This approach to teamwork improves the likelihood of identifying and resolving challenges to safety and mission success. NASA is committed to cultivating and sustaining an environment that fosters this approach to teamwork and processes that support equal opportunity, collaboration, continuous learning, and openness to innovation and new ideas.

**Excellence:** To achieve the highest standards in engineering, research, operations, and management in support of mission success, NASA is committed to nurturing an organizational culture in which individuals make full use of their time, talent, and opportunities to pursue excellence in both the ordinary and the extraordinary.

# FY 2012 In Review



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Photo: The Orion Ground Test Vehicle arrived at NASA's Kennedy Space Center Operations & Checkout (O&C) Facility on April 21. (Credit: NASA)

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# Mission Performance

## Performance Overview

Congress, the Government Accountability Office (GAO), and the Office of Management and Budget (OMB) have recognized NASA for its culture of performance and data-driven performance management. In recent years, the Agency has worked hard to improve its performance management system to increase accountability, transparency, and oversight. NASA continues to add sophistication and discipline to this system, leading to more consistent performance results across NASA's missions and to make the best use of the resources entrusted to the Agency by the American people.

In FY 2012, NASA continued along the course it set with the 2011 Strategic Plan. At the heart of NASA's strategic goals remain the core missions of human space exploration, Earth and space science, aeronautics, and technology development. The 2011 Strategic Plan also marked another step in the evolution of NASA's performance management. The Agency set a new strategic goal to emphasize the importance of supporting the capabilities that enable NASA's missions. The plan also calls out education and outreach as fundamental Agency activities in support of NASA's Mission and Vision. These strategic additions to NASA's performance framework support more effective and holistic decision-making. Strategic Goals 5 and 6 allow NASA leaders to track organizational, institutional, and outreach performance beyond discrete program, projects, and space-flight missions. This information makes data-driven decision-making possible across all of NASA's activities, and gives decision-makers the objective performance information they need to prioritize and balance funding between individual mission needs and the requirements of institutional and program capabilities that enable those missions. NASA's strategic goals are as follows:

- Strategic Goal 1: Extend and sustain human activities across the solar system.
- Strategic Goal 2: Expand scientific understanding of the Earth and the universe in which we live.
- Strategic Goal 3: Create the innovative new space technologies for our exploration, science, and economic future.
- Strategic Goal 4: Advance aeronautics research for societal benefit.
- Strategic Goal 5: Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.
- Strategic Goal 6: Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contribute to a strong national economy.

Using Agency rating criteria, NASA measures and communicates its progress toward achieving its performance goals (PGs), targets for the next three to five years, and annual performance goals (APGs) for FY 2012. NASA determines these ratings based on a series of internal assessments that are part of ongoing monitoring of NASA's program and project performance. External

entities, such as scientific peer review committees, aeronautics technical evaluation bodies, and the OMB, validate the ratings prior to publication in the Annual Performance Report (APR). This year, NASA will present its APR and final ratings with the FY 2014 Congressional Justification.

#### Rating Criteria for Performance Goals\*

Rating	Performance Goal and High Priority Performance Goal (HPPG)
<b>Green (On Track)</b>	NASA achieved or expects to achieve the intent of the performance goal or high priority performance goal (HPPG) within the estimated timeframe. NASA achieved the majority of key activities supporting this performance goal or HPPG.
<b>Yellow (At Risk)</b>	NASA expects to achieve the intent of the performance goal or HPPG within the timeframe; however, there is at least one likely programmatic, cost, or schedule risk to achieving the performance goal or HPPG.
<b>Red (Not on Track)</b>	NASA does not expect to achieve this performance goal or HPPG within the estimated timeframe.
<b>White (Canceled or Postponed)</b>	NASA senior management canceled this performance goal and the Agency is no longer pursuing activities relevant to this performance goal or the program did not have activities relevant to the performance goal during the fiscal year.

\*As part of the President's initiative to improve the performance of the Federal Government, NASA selected five HPPGs in the FY 2010, which have been retired as of FY 2012. NASA rates progress toward HPPGs using its performance goal criteria. Goals created for the next cycle of this initiative are designated as Agency Priority Goals, instead of HPPGs, and can be found on [performance.gov](http://performance.gov).

#### Rating Criteria for Annual Performance Goals (APG)

Timeframe: When Will the APG Be Achieved	Rating Criteria for APG Types			Rating
	Single Milestone or Deliverable	Multiple Deliverables, Targeted Performance, and Efficiencies	On-going Activities, Services, or Management Processes	
Current FY as planned.	NASA achieved the event or the deliverable met the intent of the APG within the timeframe.	The program/project reached the stated numeric target.	The intended result of the program/project was achieved as defined by internally held success criteria.	<b>Green</b>
Achieve next FY (will not achieve this FY as planned).	NASA did not achieve this APG in the current fiscal year, but anticipates achieving it during the next fiscal year.			<b>Yellow</b>
Will not be achieved, but progress was made.	N/A	NASA failed to achieve this APG, but made significant progress as defined by reaching 80% of the target or other internally held success criteria.	The intended results of the pro- gram/project were not achieved in this fiscal year, but significant progress was accomplished, as defined by internally held suc- cess criteria.	
Will not be achieved.	NASA did not achieve the APG and does not antici- pate completing it within the next fiscal year.	NASA achieved less than 80% of the target or other internally held success criteria.	Neither intended results nor sig- nificant progress were achieved. The progress toward the APG does not meet standards for significant progress for the inter- nally held success criteria.	<b>Red</b>
Will not be achieved due to cancel- lation or postponement.	NASA senior management canceled this APG and the Agency is no longer pursuing activities relevant to this APG or the program did not have activities relevant to the APG during the fiscal year.			<b>White</b>

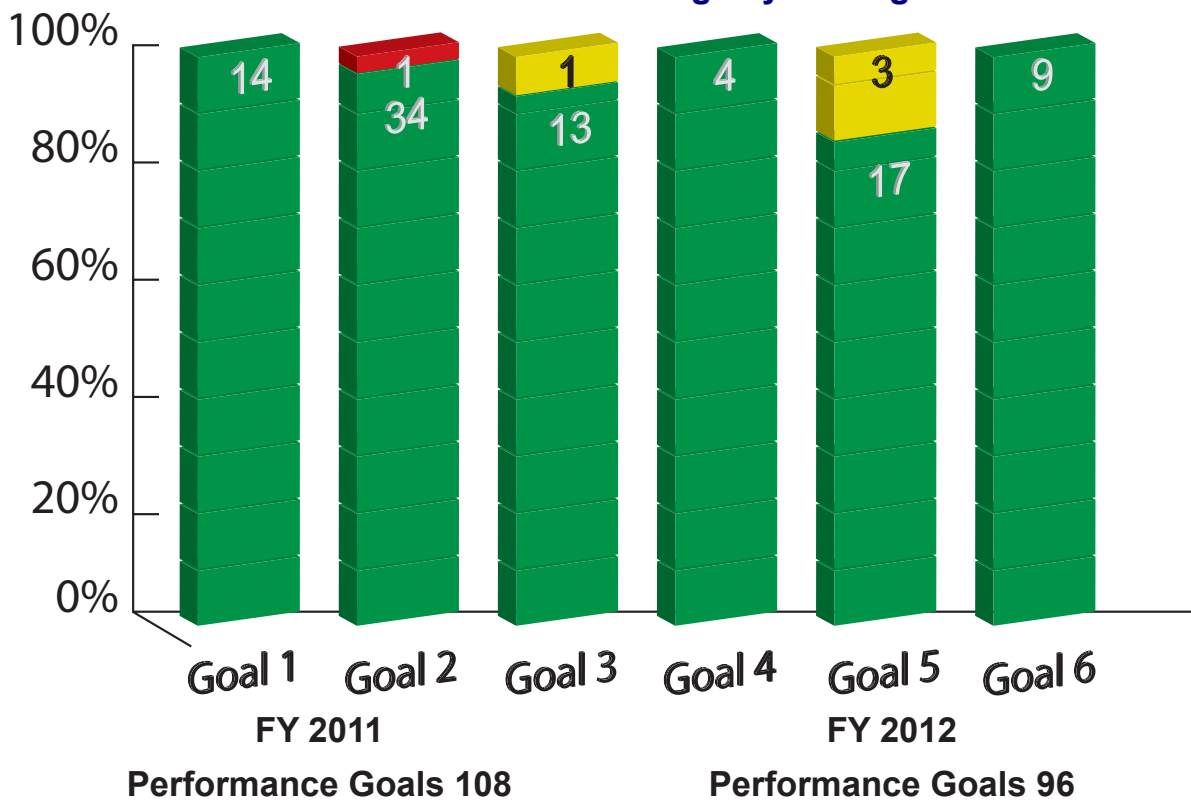
## Performance Summary

In FY 2012, NASA reviewed progress toward 96 two-to five-year performance goals and 137 APGs. Prior to accessing these measures, the FY 2012 Performance Plan was updated to reflect changes due to both Congressional budget action and to correct inaccuracies found in several measures, which were not found prior to the measures' provision in the FY 2013 budget submission to the Congress (available at <http://www.nasa.gov/news/budget/index.html>).

The summary of NASA's preliminary assessment of progress by strategic goal is provided below. The Agency will release final ratings with the Annual Performance Report in the FY 2014 Congressional Justification.

### Performance Goals\*

**FY 2012 Performance Goal Ratings by Strategic Goal**



\*These ratings reflect the preliminary year end assessment of progress. Final ratings will become available in the FY 2012 Annual Performance Report as provided with the FY 2014 Congressional Justification.

## Annual Performance Goals\*

### FY 2012 APG Ratings by Strategic Goal



**FY 2011  
APGs 149**



**FY 2012  
APGs 137**



\*These ratings reflect the preliminary year end assessment of progress. Final ratings will become available in the FY 2012 Annual Performance Report as provided with the FY 2014 Congressional Justification.



## Spotlight: Mars Science Laboratory

### Curiosity, NASA's Largest and Most Capable Rover Ever, Sent to Another Planet



NASA's Mars Science Laboratory (MSL) mission set down a large, mobile laboratory—the rover Curiosity—at Gale Crater, using precision landing technology that makes many of Mars' most intriguing regions viable destinations for the first time. During the 23 months after its landing, Curiosity will analyze dozens of samples drilled from rocks or scooped from the ground as it explores with greater range than any previous Mars rover. Curiosity carries the most advanced payload of scientific gear ever used on Mars' surface, a payload more than 10 times as massive as those carried by earlier Mars rovers. Its assignment: Investigate whether conditions have been favorable for microbial life and for preserving clues in the rocks about possible past life.

NASA launched the Mars Science Laboratory spacecraft on November 26, 2011. Mars rover Curiosity landed successfully on the floor of Gale Crater on August 6, 2012, Universal Time. Engineers designed the spacecraft to steer itself during descent through Mars' atmosphere with a series of S-curve maneuvers similar to those used by astronauts piloting NASA space shuttles. During the three min-

utes before touchdown, the spacecraft slowed its descent with a parachute, and then used small retrorockets mounted around the rim of an upper stage. In the final seconds, the upper stage acted as a sky crane, lowering the upright rover on a tether to the surface. Curiosity is about twice as long (about 3 meters or 10 feet) and five times as heavy as NASA's twin Mars Exploration Rovers, Spirit and Opportunity, launched in 2003. It inherited many design elements from them, including six-wheel drive, a rocker-bogie suspension system, and cameras mounted on a mast to help the mission's team on Earth select exploration targets and driving routes. Unlike earlier rovers, Curiosity carries equipment to gather samples of rocks and soil, process them, and distribute them to onboard test chambers inside analytical instruments.

The overarching science goal of the mission is to assess whether the landing area has or ever had environmental conditions favorable to microbial life, both its habitability and its preservation. Curiosity landed near the foot of a layered mountain inside Gale Crater.

Layers of this mountain contain minerals that form in water and may also preserve organics, the chemical building blocks of life.

The portion of the crater floor where Curiosity landed has an alluvial fan likely formed by water-carried sediments. New observations from Curiosity of rounded pebbles embedded within rocky outcrops provide concrete evidence that a stream once ran vigorously across this area on Mars, creating the alluvial fan. This evidence—images of rocks containing ancient streambed gravels—is the first of its kind.

**For the NASA MSL/Curiosity mission page, [click here](#).**

**For the JPL MSL/Curiosity mission page, [click here](#).**



The image shows the layering in the base of Mount Sharp (the science destination for the Curiosity Rover) that made Gale Crater such an attractive science target for the Mars Science Laboratory Mission. The colors in this image have been enhanced to simulate the lighting conditions that exist on Earth, which was done to make comparisons with similar terrains easier. For scale, the conical mound in the foreground in the center of the image is approximately 1,000 feet (300 meters) across and 300 feet (100 meters) high. Mount Sharp is about 3 miles (5 kilometers) high. (Credit: NASA/JPL-Caltech/MSSS)

## Link to a Watery Past



In this image from NASA's Curiosity Rover, a rock outcrop called Link pops out from a Martian surface that is elsewhere blanketed by reddish-brown dust. The fractured Link outcrop has blocks of exposed, clean surfaces. Rounded gravel fragments, or clasts, up to a couple inches (few centimeters) in size are in a matrix of white material. Many gravel-sized rocks have eroded out of the outcrop onto the surface, particularly in the left portion of the frame. The outcrop characteristics are consistent with a sedimentary conglomerate, or a rock that was formed by the deposition of water and is composed of many smaller rounded rocks cemented together. Water transport is the only process capable of producing the rounded shape of clasts of this size.

The Link outcrop was imaged with the 100-millimeter Mast Camera on September 2, 2012, which was the 27th sol, or Martian day of operations.

The name Link is derived from a significant rock formation in the Northwest Territories of Canada, where there is also a lake with the same name.

Scientists enhanced the color in this version to show the Martian scene as it would appear under the lighting conditions we have on Earth, which helps in analyzing the terrain.

(Credit: NASA/JPL-Caltech/MSSS)

## **Strategic Goal 1:**

### **Extend and sustain human activities across the Solar System.**

For over 50 years, NASA has been tasked with developing the capabilities that will support the country's long-term human spaceflight and exploration efforts. With the help of domestic and international partners, NASA has embarked on a steady progression of activities and milestones that has prepared the Agency for the more difficult challenges ahead—expanding permanent human presence beyond low Earth orbit. NASA will pursue this goal through strategic investments and partnerships to drive advances in science and technology. To be successful, NASA will need equal and full participation from international partners and the commercial sector.

#### **Commercial Partner Successfully Completes First Commercial Cargo Demonstration Mission**

On May 31, 2012, Space Exploration Technologies (SpaceX) completed its final Commercial Orbital Transportation Services (COTS) demonstration mission, and became the first commercial resupply service mission provider to the International Space Station (ISS). This mission was a huge step toward allowing regular cargo carrying missions to the ISS by the U.S. private sector.

SpaceX conducted the historic flight within 11 months of the final space shuttle flight, minimizing the gap in the U.S. space station cargo transportation capability. The SpaceX Falcon 9 rocket lifted off from the Kennedy Space Center on May 22, 2012 and spent the first couple of mission days testing the Dragon spacecraft's

ability to perform specific tasks while maintaining a safe distance about 1.5 miles below the space station.

Given the success of these demonstrations, NASA authorized SpaceX to approach the ISS on May 25. After closing to about 32 feet, Expedition 31 flight engineer Don Pettit of NASA used the space station's robotic arm to capture Dragon and berth it to the ISS. The station crew opened the hatch, unloaded new supplies, and then packed return cargo before closing the hatch and releasing the Dragon on May 31. The Dragon spacecraft splashed down off the coast of California that same day, and NASA confirmed that SpaceX had successfully completed all COTS demonstration mission objectives.

Successful completion of this demonstration mission, along with SpaceX's recent announce-



The SpaceX Dragon commercial craft is berthed to the Earth-facing side of the International Space Station's Harmony Node. (Credit: NASA)



ments of commercial launch agreements with other customers, indicate both goals of the COTS project—to enable the ability of NASA and commercial partner teams to develop complicated space systems that help NASA meet its needs, and to strengthen U.S. industrial capability and competitiveness—are being accomplished. Following the successful completion of this COTS demonstration mission, NASA will implement the Commercial Resupply Services contract for regular resupply mission to the ISS, beginning in FY 2013.

### Other Key Achievements in FY12

In August 2012, NASA signed new agreements with three American commercial companies to facilitate industry's development of an integrated crew transportation system. These agreements will enable advances that could ultimately lead to the availability of commercial human spaceflight services for government and commercial customers. NASA's partners include Sierra Nevada Corporation, SpaceX, and The Boeing Company.



The six members of the Expedition 32 crew pose for a group portrait aboard the International Space Station (Credit: NASA)

ISS has successfully transitioned from assembly to full utilization, and continues to operate safely on orbit with six crew. NASA continues to work closely with the Center for the Advance-

ment of Science in Space (CASIS), to manage the portion of the International Space Station that operates as a U.S. national laboratory.

The three programs managed by the Exploration Systems Division (ESD), the heavy-lift Space Launch System (SLS) booster, the Orion Multipurpose Crew Vehicle (MPCV), and the Ground Systems Development Operations (GSDO), continue to make appreciable progress. The Orion MPCV Program delivered the Exploration Test Flight 1 (EFT-1) crew module to Kennedy Space Center on July 2, 2012, in preparation for a Fiscal Year 2014 demonstration mission. The SLS and GSDO programs successfully completed several key Agency-wide reviews in a process that will lead to project confirmation.

The National Research Council's recent report, titled "Recapturing a Future for Space Exploration: Life and Physical Sciences," called on NASA to "reinvigorate its partnership with the life and physical sciences research community." NASA has taken several important steps in response. After nearly a decade of uncertainty about the future of animal research in space, NASA has reinitiated firm plans to conduct basic biological research with rodents on the ISS. NASA has also reestablished its program in atomic physics, with a new payload in development that is projected to create the coldest matter in the universe aboard the ISS by 2017.

[Click here to read the National Research Council's report.](#)



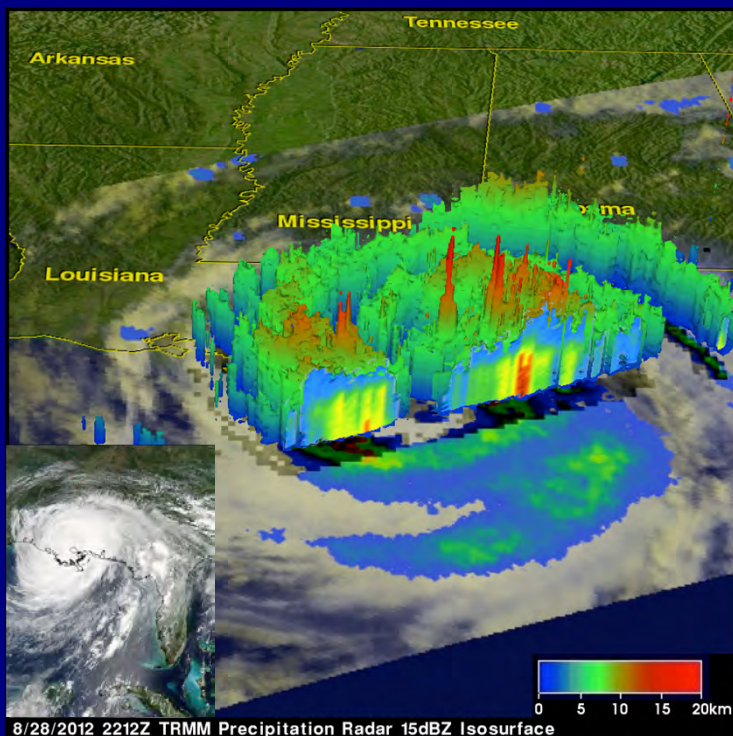
## **Strategic Goal 2:**

**Expand scientific understanding of the Earth and the universe in which we live.**

NASA is expanding the scientific understanding of Earth and the universe by pursuing the answers to profound science questions: How and why are Earth's climate and environment changing? How do planets and life originate? How does the universe work, and what are its origin and destiny? Are we alone? Using the priorities set by the Nation's best scientific minds through the National Academies' decadal surveys in Earth science, heliophysics, planetary science, and astronomy and astrophysics, NASA develops missions of scientific exploration. NASA uses space observatories and space probes to view the Earth from space, observe and visit other bodies in the solar system, and gaze out into the galaxy and beyond. NASA analyzes the data gathered by these science missions to enhance humanity's understanding of its place in the universe

### **NASA Satellites Provide Forecasters with Timely Observations of Tropical Storm Isaac as it Drenches Gulf Coast States**

Scientists used the data captured by NASA satellites to learn more about hurricanes and increase their predictability. NASA satellites provided forecasters with valuable data on rainfall rates within Tropical Storm Isaac as the storm tracked over Louisiana and Mississippi. Isaac supplied large quantities of rain, drawing its power from the warm waters of the Gulf of Mexico. NASA's Tropical Rain Measuring Mission (TRMM) satellite captured relevant and timely data for forecasters. For example, the



From TRMM's Precipitation Radar observations, scientists at NASA's Goddard Space Flight Center developed a three-dimensional view of rainfall within then Hurricane Isaac. The 3-D image showed that very powerful thunderstorms near Isaac's eye were reaching heights of almost 11 miles. Those tall thunderstorms near a hurricane's center release heat and contribute to a hurricane's power.

The Moderate Resolution Imaging Spectroradiometer (MODIS) instrument onboard NASA's Aqua satellite captured this visible true color image of Hurricane Isaac on August 29 at 2:50 p.m. EDT after it had made its second landfall. (Credit: NASA Goddard/MODIS Rapid Response Team)

mission revealed that some areas within Isaac were dropping rainfall at a rate of 2.75 inches per hour.

The TRMM satellite twice flew directly above Hurricane Isaac as it began to pound Louisiana with strong winds and heavy rainfall. NASA provided the operational forecasters, in near-real time, an animated fly-by of Hurricane Isaac's rainfall and structure.

[Click here to read more about the Tropical Rain Measuring mission, a joint mission between NASA and the Japanese space agency JAXA.](#)

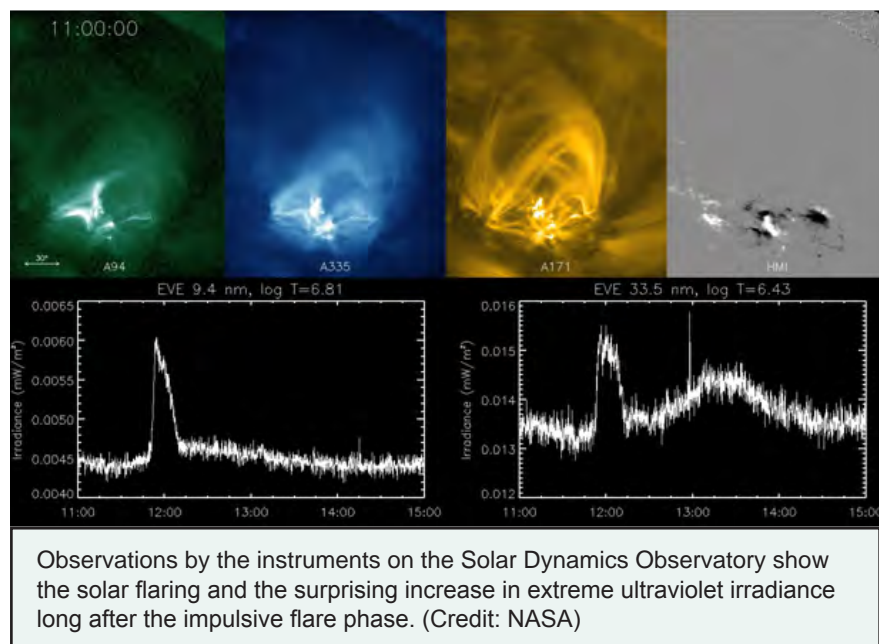
### NASA Heliophysics System Observatory Captures Earth's Reaction to Solar Flares

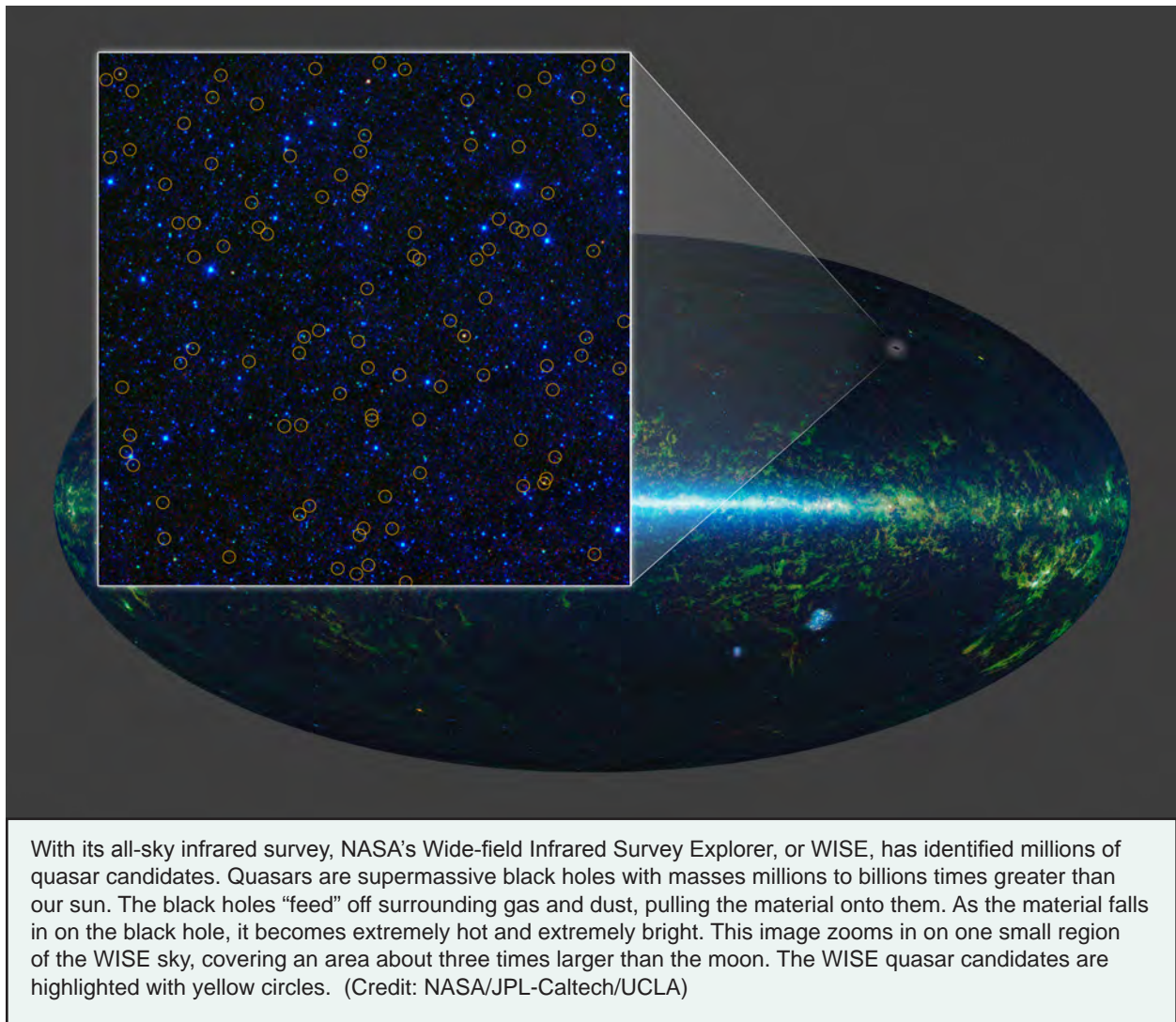
NASA maintains a fleet of research spacecraft that monitor the Sun's activity and its impacts on Earth and the solar system. Solar flares are one continually surprising solar phenomena observed by these satellites. When the energy from these flares impacts Earth's atmosphere, it alters the atmospheric structure. This can affect the reliability of technologies located in space, such as communications and global positioning satellites (GPS), and on the ground, such as electric power grids. Eruptive flares on the Sun are the largest explosive events in the solar system.

In March 2012, the Thermosphere, Ionosphere, Mesosphere, Energetics and Dynamics (TIMED) spacecraft and the Solar Dynamics Observatory (SDO) measured the impact of a powerful solar flare on the Earth's upper atmosphere. In direct response to the energy input from the flare, the upper atmosphere

was observed to heat up. During the heating impulse, the thermosphere puffed up like a marshmallow held over a campfire, temporarily increasing the drag on low-orbiting satellites. Extra drag helps clear space junk out of Earth orbit, but it decreases the lifetime of useful satellites by bringing them closer to re-entry.

Other flare observations by SDO and the Ramaty High Energy Solar Spectroscopic Imager (RHESSI) revealed that a substantial fraction of flares, approximately 15 percent, have a pronounced "late phase" that can pump 40 percent more energy into space than previously realized. Solar Flares are intense bursts of highly energetic radiation caused by the release of magnetic energy associated with sunspot regions. NASA studies these bursts because radiation from space weather poses a danger to astronauts and spacecraft, and the energetic ultraviolet to X-ray emission from flares adds additional heat to the Earth's upper atmosphere. Observations like those from SDO and RHESSI help NASA understand the hazards of space weather to equipment and humans.





With its all-sky infrared survey, NASA's Wide-field Infrared Survey Explorer, or WISE, has identified millions of quasar candidates. Quasars are supermassive black holes with masses millions to billions times greater than our sun. The black holes "feed" off surrounding gas and dust, pulling the material onto them. As the material falls in on the black hole, it becomes extremely hot and extremely bright. This image zooms in on one small region of the WISE sky, covering an area about three times larger than the moon. The WISE quasar candidates are highlighted with yellow circles. (Credit: NASA/JPL-Caltech/UCLA)

### **Wide-Field Infrared Survey telescope (WISE) has Spotted Millions of "Supermassive" Black Holes**

NASA's Wide-field Infrared Survey Explorer (WISE) mission has led to a bonanza of new-found supermassive black holes and extreme galaxies called hot DOGs, or dust-obscured galaxies. Images from the telescope have revealed millions of dusty black hole candidates across the universe and about 1,000 even dustier objects thought to be among the brightest galaxies ever found.

The latest findings are helping astronomers better understand how galaxies and the behemoth black holes at their centers grow and

evolve together. For example, the giant black hole at the center of our Milky Way galaxy, called Sagittarius A\*, has 4 million times the mass of our sun and has gone through periodic feeding frenzies where material falls towards the black hole, heats up, and irradiates its surroundings. Bigger central black holes, up to a billion times the mass of our sun, may even shut down star formation in galaxies. In two other WISE papers, researchers report finding what are among the brightest galaxies known, one of the main goals of the mission. So far, they have identified about 1,000 candidates. These extreme objects can pour out more than 100 trillion times as much light as our sun.



## Fermi Gamma-Ray Space Observatory Observations of Dwarf Galaxies Provide New Insights on Dark Matter

While scientists still don't know what makes up the mysterious dark matter thought to dominate the universe, a new study of dwarf galaxies orbiting the Milky Way using NASA's Fermi Gamma-ray Space Telescope has chipped away at the possibilities, offering intriguing hints about the nature of dark matter.

Dark matter constitutes about 80 percent of the matter in our universe. By studying numerous dwarf galaxies—satellite systems that orbit our own Milky Way galaxy—NASA's Fermi Gamma-ray Space Telescope has produced some of the strongest limits yet on the nature of the hypothetical particles suspected of making up dark matter.



This dwarf spheroidal galaxy in the constellation Fornax is a satellite of our Milky Way and is one of 10 used in Fermi's dark matter search. The motions of the galaxy's stars indicate that it is embedded in a massive halo of matter that cannot be seen. (Credit: ESO/Digital Sky Survey 2)

### **Strategic Goal 3:**

**Create the innovative new space technologies for our exploration, science, and economic future.**

For decades, NASA investment in space technology has helped make the United States the global leader in space exploration and has significantly contributed to the technology-based U.S. economy. NASA continues that legacy today through a balanced portfolio of technology development at various stages of technical maturity. NASA invests in revolutionary concepts that help develop the Nation's workforce and innovation community. NASA generates transformative and crosscutting technology breakthroughs that enable the Agency's missions and benefit the commercial sector. NASA creates new ideas and markets that strengthen the economy and contribute to U.S. technological global leadership.

#### **Developing the Innovation Community**

During FY 2012, NASA invested in a potentially revolutionary concept to robotically construct Lunar and Martian infrastructure using in-situ resources. This system is based on contour crafting and other state-of-the-art three-dimensional (3-D) printing technologies, and it has potential for safe and affordable landing pads, roads, and protective hangers on the Moon and Mars. Automated building technologies could also revolutionize construction on Earth, especially in dense urban environments and remote regions of the globe. NASA invests in revolutionary concepts, such as this university-led effort, not only to advance the technology state-of-the-art today, but also to develop new skills in the space technology workforce required for tomorrow's breakthroughs.

[Click here for more information about in-situ resource utilization.](#)

NASA helps develop the Nation's space technology workforce, in part, by investing in revolutionary concepts pursued by academic faculty and students. In FY 2012, one such student developed and characterized fast-burning solid fuels for hybrid rocket motors. The project resulted in a new casting procedure and experimental demonstration of enhanced fuel characteristics. While this project provides valuable data for the development of future propulsion systems, perhaps the greater value is in the professional development of the student researcher, who recently accepted a position as a Propulsion Development Engineer at a prominent aerospace firm. He directly credits his NASA fellowship for the opportunity.

[Click here for more information about the student research.](#)

#### **Generating Transformative and Crosscutting Technology Breakthroughs**

In July, NASA launched the Inflatable Reentry Vehicle Experiment (IRVE-3) by sounding rocket. This experiment represents a critical step in achieving rapid infusion of mission-capable hypersonic inflatable decelerator systems, and it demonstrates NASA's commitment to transformative technology breakthroughs. The IRVE-3 test showed that a space capsule can use an inflatable outer shell to slow and protect itself as it enters an atmosphere at hypersonic speed during planetary entry and descent.

[Click here for more information about IRVE-3.](#)

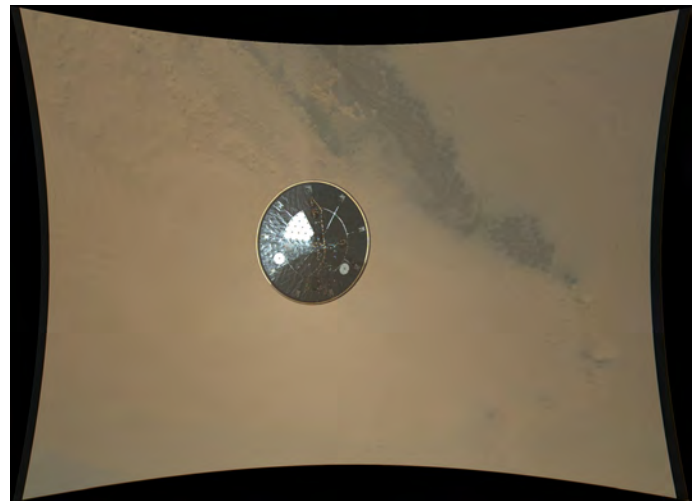
Engineers check out the Inflatable Reentry Vehicle Experiment (IRVE-3) following the complete inflation system test under vacuum conditions in the Transonic Dynamics Tunnel at NASA's Langley Research Center in Hampton, Va.

(Credit: NASA Langley/  
Sean Smith)



In August, the Mars Science Laboratory Entry, Descent and Landing Instrumentation (MEDLI) suite entered the Martian atmosphere installed in the heat shield of the MSL aeroshell. MEDLI successfully returned the most complete Mars entry data set in history. MEDLI provided atmospheric entry progress information to operators in real time and helped verify the MSL spacecraft aerodynamics, aerothermal environment, thermal protection system response, parachute performance, and guidance and control system performance during entry. NASA is now applying its MEDLI flight experience to the Exploration Flight Test-1 mission of the Multi-Purpose Crew Vehicle, solidifying expertise and saving valuable resources.

**Click here for more information  
about MEDLI's successful use  
during the MSL landing.**



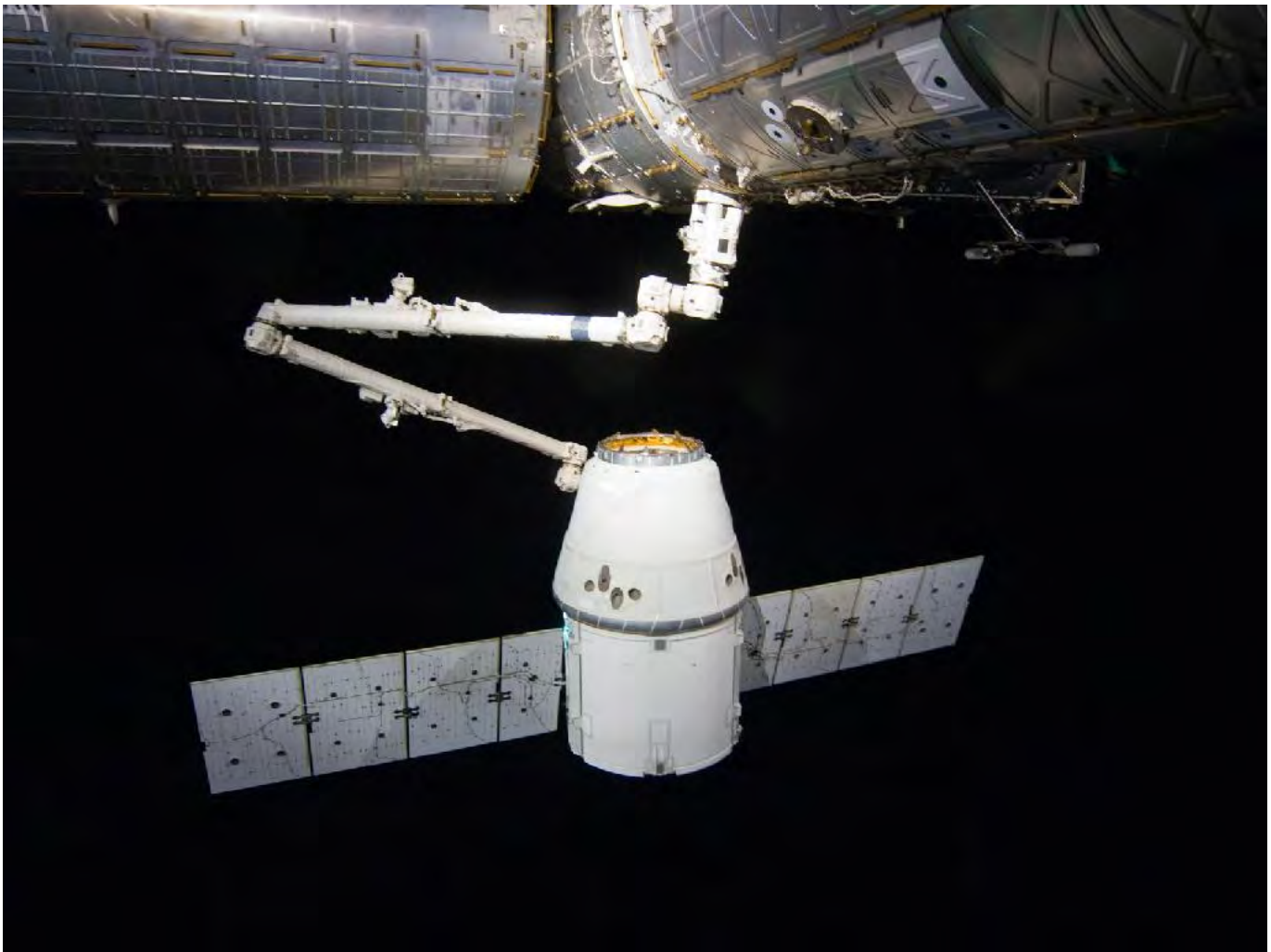
Photographed by the Mars Descent Imager instrument (MARDI), the MEDLI instrument array is visible on the MSL heat shield as it drops away during descent to Mars. (Credit: NASA/JPL-Caltech/MSSS)



## Creating New Ideas and Markets that Strengthen Our Economy

In May, technology developed through NASA's Small Business Innovative Research (SBIR) Program supported the docking of SpaceX's Dragon spacecraft during the first commercial cargo mission to the International Space Station (ISS). The innovative 3-D Flash Lidar Video Camera, developed by Advanced Scientific Concepts, Inc. (ASC), generates a 3-D image using a two-dimensional imaging array, generates 30 images a second, and provides a motion picture of an approaching scene with

a single camera flash. ASC's system holds even greater potential for future automated docking and hazard avoidance applications. Accordingly, NASA continued to support the technology in FY 2012, focusing on embedded processing for even greater image enhancement. New, more advanced autonomous systems have the potential to impact industries outside spaceflight, such as robotics and manufacturing, thereby creating new capabilities and markets

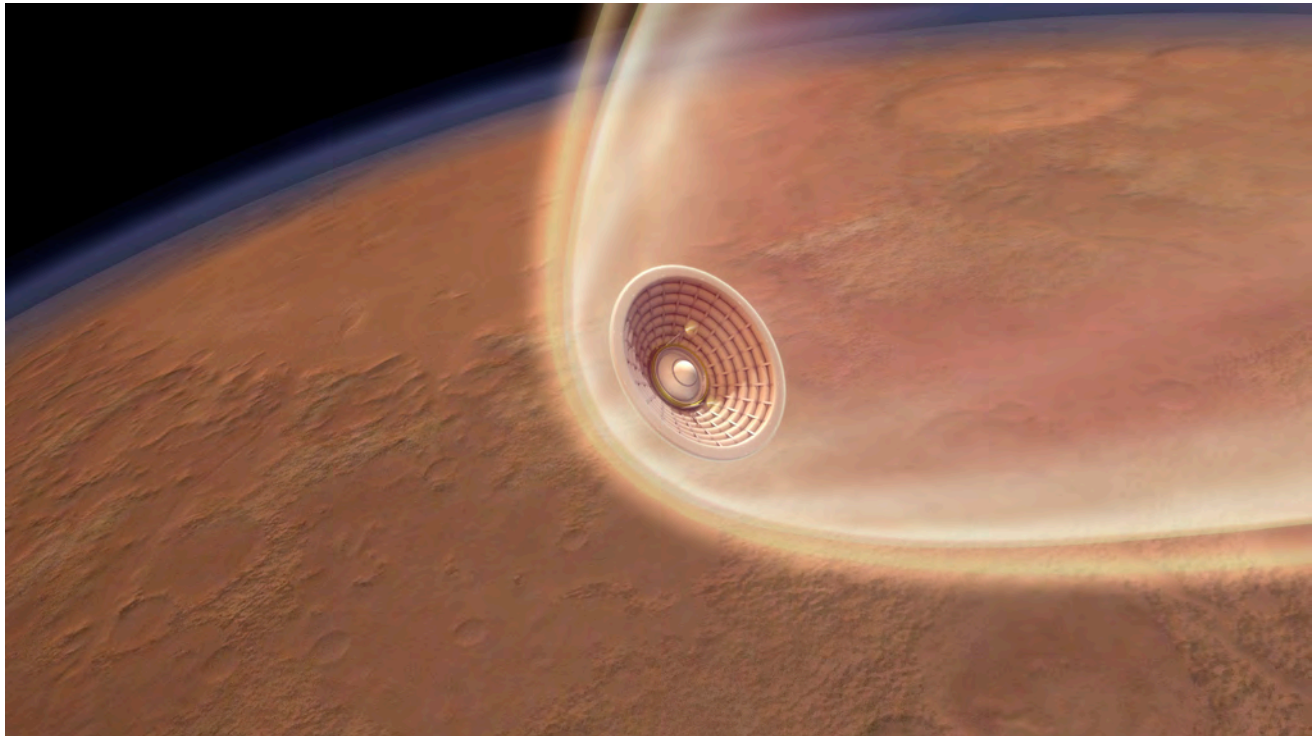


The SpaceX Dragon spacecraft docks to ISS with the help of a NASA SBIR-Developed 3D Camera. (Credit: NASA)

## Other Key Achievements in FY12

- Operation of the first in-space humanoid dexterous manipulator (Robonaut 2) on the International Space Station;
- Advancement of woven thermal protection systems from innovative concept to game changing technology development;
- Initiation of the Edison Demonstration of Smallsat Networks (EDSN) project;
- Completion of the preliminary design review of the Solar Sail technology demonstration; and
- Support of student researchers through 80 Space Technology Research Fellowships.

[Click here to learn more about how NASA drives advances in technology on NASA's Office of the Chief technologist.](#)



When the technology is fully mature, inflatable reentry vehicles would allow for larger payloads than current launch vehicle designs can accommodate. For example, a rover larger than Curiosity could be sent to Mars. (Credit: NASA)

## **Strategic Goal 4:**

### **Advance aeronautic research for societal benefits.**

A key enabler for American commerce and mobility, U.S. commercial aviation is vital to the Nation's economic well-being. NASA's aeronautics research focuses on the most appropriate cutting-edge research and technologies to overcome a wide range of aeronautics challenges for America's current and future transportation system. As demands on the aviation transportation system grow, NASA is discovering ways to improve aviation safety and air traffic, and reduce fuel consumption, noise, and emissions.

#### **NASA Breakthrough Makes Flights More Time and Fuel Efficient in Bad Weather**

The biggest cause of airline flight delays is hazardous weather. To help alleviate this problem, NASA developed and tested a new decision-support system called "Dynamic Weather

Re-Route" that automatically finds alternative routes that help airlines save time and fuel for en-route aircraft.

Flight routes are based on predicted weather and established prior to aircraft departure. Because weather patterns and severity change over time, flight routes often become congested and inefficient which results in delays, wasted fuel, and sometimes hazardous conditions for aircraft and travelers. Air traffic controllers lack automation tools to generate new routes that save time and fuel once the aircraft are airborne.

Laboratory simulations and field tests of NASA's new Dynamic Weather Re-Route technology conducted with a U.S. air carrier have shown potential average savings in time of 10 minutes or in operating cost of \$1,000 to \$1,700 per flight impacted by severe weather. Additional testing is scheduled to take place in Fall 2012.

[Click here for more information about the Aviation Systems Division.](#)



The Dynamic Weather Re-Route capability allows airlines to safely avoid weather hazards and reduce fuel burn saving time and money. (Credit: NASA)

#### **NASA Increases Understanding of Hazardous Ice Accumulation in Jet Engines**

Aircraft flying through high altitude thunderstorms encounter high concentrations of ice crystals. Under certain conditions, these ice crystals may cause ice to form inside a jet engine in a way that can degrade its performance, potentially leading to engine power loss. To better understand the hazards of high altitude icing, NASA modeled the conditions an engine would encounter throughout a hypothetical flight. NASA's model incorporated the effects of ice accumulation, melting, and sublimation (conversion from solid to gaseous state)



NASA research into high altitude icing will help pilots avoid hazardous conditions and lead to improved engine design (Credit: NASA)

into a basic jet engine performance computer simulation. A study used the model to estimate the risk of engine icing in ice crystal conditions and the effect of the blockage on engine performance. Results showed that ice particle size is an important factor affecting engine icing. The distribution of ice particle sizes in clouds is currently unknown and is of high interest to NASA and its U.S. and international partners. Working with partners, NASA is conducting studies that further explore the atmospheric conditions leading to ice crystal icing and the effects of that icing on engine performance. Results from these studies will help aircraft remain clear of hazardous icing conditions and make aircraft engines more resilient if those conditions do occur

[Click here for more information about engine ice research.](#)

### **NASA Researches Ways to Make Aircraft More Fuel Efficient and Quiet**

NASA continued research on future aircraft engine designs that aim to dramatically reduce the impact of the aviation industry on the environment by focusing on reduction of fuel burn, noise, and emissions. Two types of highly fuel efficient jet engine concepts were compared to determine their performance in reducing

the rate of fuel consumption and noise. One of the systems, called an “Open Rotor”, does not encase the engine fan blades in an engine housing, which is typical in traditional jet engine designs. The second system, referred to as an “Ultra High Bypass (UHB) Turbofan” is a much more fuel efficient version of the aircraft engine commonly used by airliners today. Research has validated that both engine concepts have the potential to dramatically reduce fuel burn. The Open Rotor shows greater potential, but at the price of increased noise production over the UHB concept. These results will provide data to the aviation industry and regulatory community to make informed decisions on future aircraft propulsion systems, with a continual emphasis on reducing their impact on the environment.

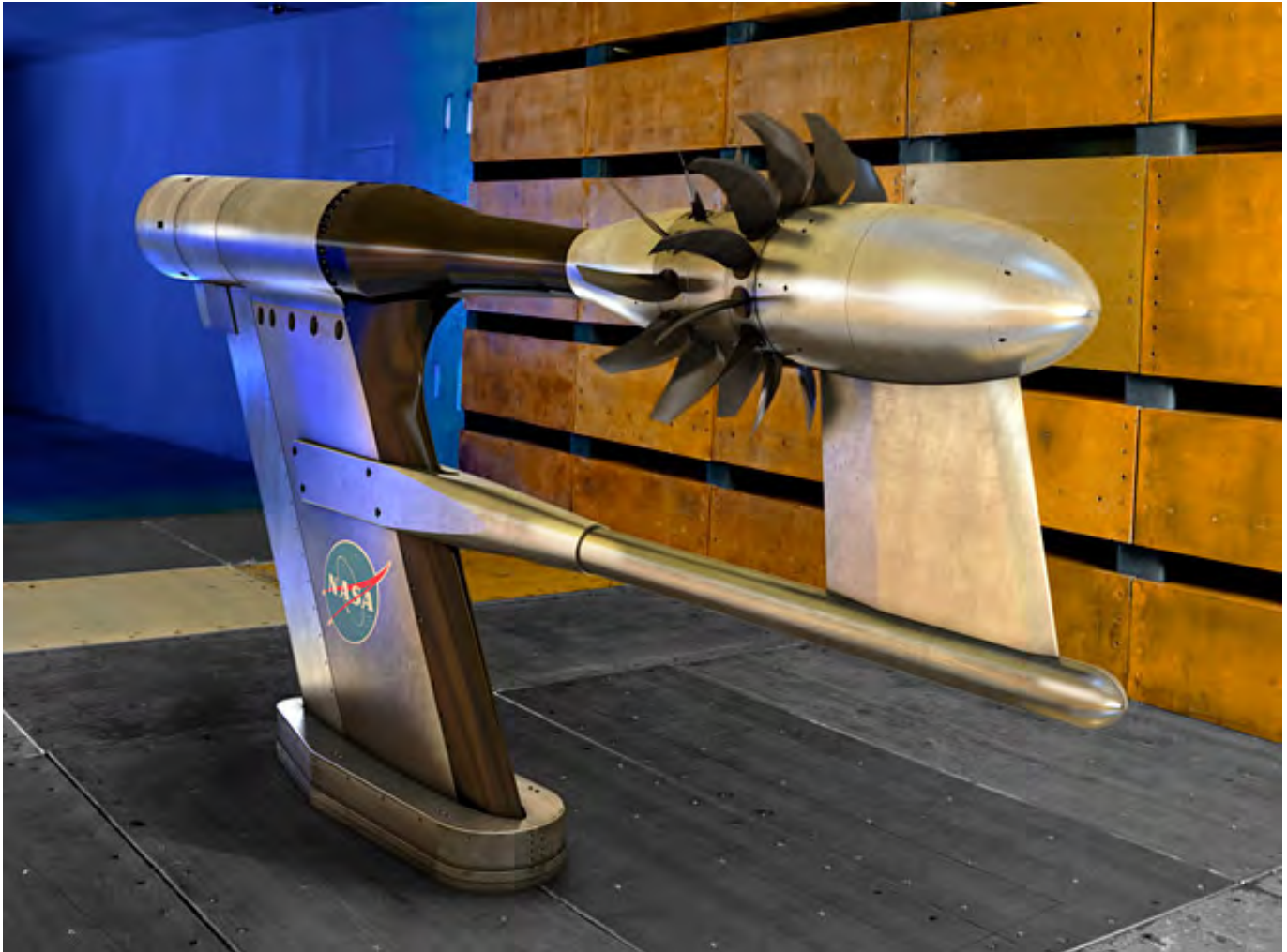
[Click here for more information about open rotor technology.](#)

### **Other Key Achievements in FY12**

- NASA flight tests in low visibility conditions demonstrated the ability of “Synthetic and Enhanced Vision Systems” to provide improved safety, and validated the results of previous simulator studies.
- NASA successfully transitioned the “Efficient Descent Advisor” technology to the Federal Aviation Administration for inclusion in their 3D Path Arrival Management operational capability, enabling fuel-efficient descents in terminal airspace.
- NASA conducted successful wind tunnel testing of a low-noise aircraft design configuration called “Hybrid Wing Body” to assess its aerodynamic characteristics.

[Click here for more information about NASA's Aeronautics Research.](#)





Research on future aircraft engine designs, such as the “Open Rotor” aims to reduce the environmental impact of aviation.  
(Credit: NASA, GRC)

## **Strategic Goal 5:**

### **Enable program and institutional capabilities to conduct NASA's aeronautic and space activities.**

**D**iversity, sustainability, and innovation are keys to NASA's adaptability, and an integral part of NASA's mission success. NASA strives for an organizational culture and work environment that includes varying perspectives, education levels, skills, life experiences, and backgrounds to enable excellence and allow individual and the organization to maximize potential. The support and participation of everyone at NASA, including executive leadership, managers, supervisors, and employees, are critical components of successful implementation.

#### **Diversity: Enhancing NASA's Inclusive Work Culture**

NASA's Diversity and Inclusion Strategic Implementation Plan, spearheaded by the Offices of Diversity and Equal Opportunity (ODEO) and of Human Capital Management (OHCM), provides a blueprint for fully leveraging the Agency's diversity over the course of the next five years and beyond. As such, it offers innovative Agency guidelines and strategies designed to enhance the inclusiveness of NASA's work environments and further broaden the reach of NASA's education, recruitment, and small business efforts.

NASA developed an enhanced hiring program to refresh the Agency's talent pool. Key components of the program include the federal student employment initiative and an agency recruitment program. OHCM and ODEO, under the auspices of the Agency Diversity and Inclusion Plan, have partnered closely to enhance

the Agency's recruitment strategies, allowing the Agency to reach a broader and more diverse talent pool through implementation of the new Pathways Program.

NASA's OHCM developed a human capital framework designed to create a workforce culture that builds on innovation. OHCM designed the Work from Anywhere campaign, an outreach effort to educate the NASA workforce on the flexible workplace policies already available that empower employees to engage effectively, in or out of the office. The NASA policies highlighted by the Work from Anywhere campaign remove geographical barriers to diversity in the Agency's workforce, allowing employees to work in locations away from NASA Centers.

NASA also continues to make great strides in advancing equal opportunity for all employees, as evidenced in the implementation of the Agency's Individuals with Disabilities plan. An Agency Stakeholders group meets regularly to address issues of access to electronic and information technology; NASA Centers recruit student interns with disabilities as part of Project Achieving Competence in Computing, Engineering, and Space Science (ACCESS); and Centers continue to improve the accessibility of facilities for individuals with disabilities.

In another key effort to advance equal opportunity, NASA developed procedures to provide the Agency's lesbian, gay, bisexual, transgender (LGBT) community with an avenue of redress parallel to the Equal Employment Opportunity complaints process. Current federal employment discrimination law does not protect sexual orientation and gender identity.

### **Sustainability: Contemporary Management Concepts that Keep NASA Running Smoothly**

Sustainability concepts and thinking are inherent in NASA's mission, strategic goals, and overarching strategies. NASA's Office of Strategic Infrastructure has drafted the Strategic Sustainability Performance Plan which will guide NASA strategies for greenhouse gas and petroleum use reduction, water use efficiency, pollution prevention, waste reduction, and sustainable acquisition. In fact, NASA received a green rating on its most recent OMB scorecard by achieving a 12 percent reduction in petroleum use in its entire vehicle fleet compared to 2005 and is on track for a 20 percent reduction by 2015.

NASA is also promoting sustainability concepts throughout the Agency by implementing energy efficiency projects at three NASA Centers that will replace existing lighting and heating, ventilation, and air conditioning (HVAC) systems with higher efficiency systems, connect stand-alone HVAC equipment into central control systems for improved management of run hours and temperature setpoints, and retrocommission existing building electrical and mechanical systems to optimize system functionality considering current mission needs. When complete, these projects will reduce utility consumption and cost, reducing energy intensity and greenhouse gas emissions, and increasing high performance and sustainable buildings.

NASA's Office of the Chief Information Officer (OCIO) created the Information Technology Laboratory Prototype Project (IT Labs) to help NASA make strategic investments in innovation. Information technology (IT) is not only a

### **Innovation: NASA sets a New Standard for its Information Technology**

multi-faceted discipline, it is subject to constantly evolving technology. The IT Labs is an innovation incubator taking new ideas from the NASA community and developing them as part of a rapid, low-cost, low-risk process. Working with the OCIO Chief Technology Officer, IT Labs solicited proposals from across NASA. Thirty-six research candidates were submitted and NASA funded sixteen to proceed to execution. Candidates were assessed by a diverse group of reviewers, including the Center Technology Officers, OCIO Service Executives, and Agency Mission Partners. Via [labs.nasa.gov](http://labs.nasa.gov), the Agency OCIO shares the results of the program with all of NASA, enabling others to apply the lessons learned to their own projects, or collaborate on new efforts inspired by project results.

## Strategic Goal 6:

Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contributes to a strong national economy.


Public outreach, partnerships, and external assistance are important methods for communicating NASA's mission and inviting broad participation, allowing NASA to truly make space for all people. The Agency strives to include as many voices as possible. Fostering the interest of students in science, technology, engineering, and mathematics (STEM) education, particularly those who are traditionally underrepresented in STEM fields, aids greatly in meeting both National and Agency goals.

### Reaching for New Heights


NASA's Office of Communications informs the public and engages them in NASA's missions. The Office of Communications facilitates broad use of social media, NASA Television, nasa.gov, online streaming, media events, and exhibits, which enable NASA to broadly share its missions and activities with people around the country and around the world.

On the night of August 5, 2012, the world held its breath as the car-sized rover named Curiosity began seven minutes of terror into the atmosphere of Mars. During the months that Curiosity traveled from Earth to Mars, NASA worked to not only make sure the rover landed safely, but also to inspire people to learn about and follow the mission.


Curiosity's landing gave NASA another unique event to share with the Nation and world. NASA hosted the first ever multi-center Social with in-person participants at seven NASA centers, and virtual viewers from around the world. The @MarsCuriosity Twitter account now has over a million followers. Millions of viewers watched the landing on NASA TV, UStream, and You-

**Curiosity Rover**  
@MarsCuriosity


Read your tweets loud & Clear! #NASASocial visited Goldstone #DSN today; 1 of 3 stations where I phone home [pic.twitter.com/hMakTYpA](http://pic.twitter.com/hMakTYpA)  
5:08 PM - 15 Oct 12

**Curiosity Rover**  
@MarsCuriosity


From chemist to explorer to mayor, I am one busy bot. Just became the mayor of Mars' Gale Crater on [@foursquare](http://@foursquare) [4sq.com/QLh1uc](http://4sq.com/QLh1uc)  
5:41 PM - 5 Oct 12

**Curiosity Rover**  
@MarsCuriosity


A River Ran Through It. I found evidence of an ancient streambed on Mars, similar to some on Earth [pic.twitter.com/wfbpp7BW](http://pic.twitter.com/wfbpp7BW)  
3:12 PM - 27 Sep 12

**Curiosity Rover**  
@MarsCuriosity


Road trip! I covered 32 meters of open Martian road yesterday (sol 38). Every long drive needs a soundtrack. Any suggestions?  
2:07 PM - 14 Sep 12

**Curiosity Rover**  
@MarsCuriosity


Hello, Gorgeous! Snapped this self portrait while using my MAHLI camera & checking its dust cover [pic] <http://1.usa.gov/QayglM>  
2:33 AM - 8 Sep 12

**Curiosity Rover**  
@MarsCuriosity


These wheels were made for roving. Just completed a 100-ft (~30.5 meters) drive -- my longest yet [pic] <http://twitpic.com/arg0se>  
3:59 PM - 5 Sep 12

**Curiosity Rover**  
@MarsCuriosity

Happy birthday, Ray Bradbury! My favorite Martian chronicler would have been 92 years old today  
1:54 PM - 22 Aug 12

**Curiosity Rover**  
@MarsCuriosity

Interplanetary fist bump: @whitehouse called to congratulate my team today. Watch the video: <http://www.ustream.tv/recorded/24681663> ... #MSL  
1:07 PM - 13 Aug 12

**Curiosity Rover**  
@MarsCuriosity

Me & My Shadow... & Mount Sharp. My view of the 3-mile-high mountain in the middle of Mars' Gale crater #MSL  
<http://twitpic.com/agc3nk>  
8:23 PM - 6 Aug 12

The @MarsCuriosity Twitter feed has made over 1,200 Tweets and has more than 1,000,000 followers. From August 3 to 9, 2012, it gained 813,300 followers and was mentioned more than 195,000 times.





On September 17, 2012, Langley Research Center and the Virginia Air & Space Center (VASC) welcomed hundreds of boy scouts to earn their first ever robotics badge as part of a partnership between NASA and the Boy Scouts of America. (Credit: NASA/Sean Smith)

Tube. And thousands of people gathered in New York City to watch history in the making on the iconic big screens of Times Square.

### Maximizing Outreach Through STEM Education Partnerships

Partners help NASA reach new and broader audiences in creative ways. NASA's Office of Education seeks to develop partnerships that have national impact and engage underrepresented and underserved audiences. Working with partners, the Office of Education strives to make effective and efficient use of the Agency's missions and educational resources to provide learners of all ages stimulating opportunities in STEM education. NASA enters into partnerships with innovative organizations that have wide ranging areas of expertise. The intent is to bring NASA STEM to learners and educators of all ages with varying interests and learning styles.

Reaching out to these broader audiences, NASA and its partners have developed eight NASA Summer of Innovation (Sol) themed camps. Thirty-hour, two-day, and one-day modules were outlined for each theme, allowing design flexibility for collaborators. They also awarded more than 200 Sol mini-grants, each with a maximum value of \$2,500. The National

Space Grant Foundation manages the 2012 Sol mini-grants for NASA, and the awardees selected included non-profit educational organizations, public and private schools, youth foundations, and science centers. The program engaged 3,380 educators in Sol professional development activities. The summer session reached 38,949 students who were largely from underrepresented or underserved populations, including 31% Hispanic, 26% African American, and 79% low-income students.

### A 21st Century Approach to Equal Opportunity and Inclusion

NASA champions the spirit of inclusivity with its commitment to civil rights, and to assure that all have access to participate in the business of space. NASA conducts a vigorous program of civil rights compliance reviews of its grantees. NASA's Office of Diversity and Equal Opportunity continued its external technical assistance efforts on civil rights with the publication of a new resource tool for grantees, titled, "Title IX & STEM: A Guide to Conducting Self-Evaluations for Science, Technology, Engineering, and Mathematics Programs" (June 2012). NASA published an interactive version of this tool online in addition to traditional hard copy publication to maximize accessibility and use. The White House Council on Women and Girls activities commemorating the 40th anniversary of Title IX, held on June 20, 2012, recognized the publication, as well. NASA's external civil rights program continues to be acknowledged as a leader in the field by the Department of Justice Civil Rights Division, and external stakeholder organizations such as the Society of Women Engineers and the Association of Women in Science.

# Financial Performance

## Financial Overview

Over the years, NASA has made significant improvements to the integrity of its financial management systems, processes and reports, and the Agency overcame significant financial reporting challenges to achieve an unqualified audit opinion in 2011. In fiscal year 2012, NASA focused on maintaining the unqualified opinion while improving efficiencies and reducing costs. For example, in FY 2012 NASA achieved its administrative savings by reducing spending on travel, printing, supplies, and advisory services. These savings, which are associated with the Administration's management agenda to Promote Efficient Spending, enabled the Agency to increase funding for research and development contracts, facilities enhancements and grants. NASA is committed to effectively and efficiently managing funds appropriated by Congress to incur obligations for goods and services necessary to execute NASA mission goals within the apportionment limits from Office of Management and Budget (OMB) and in compliance with federal financial accounting standards.

NASA's financial values are a critical component of the Agency's effective financial management. The information provided in the next section reflect how NASA meets its financial values of ensuring financial stewardship, promoting effective resource management, ensuring the integrity of financial data, enhancing capabilities and delivering a positive customer experience.

## NASA Financial Values

NASA's financial values provide the foundation for effective financial management. The values work together to deliver information that can be readily understood and used by NASA decision makers, governmental stakeholders and the American public. The sections below explain each of the values and describe key actions taken to integrate the values into NASA's financial processes to improve financial management and reporting.

### Ensure Financial Stewardship

NASA is committed to financial management excellence that complies with applicable laws and regulations that demonstrates stewardship of budgetary resources while achieving its missions. In achieving financial management excellence, emphasis is placed on effective controls and accurate financial information that promote accountability, transparency, and compliance. In FY 2011 and continuing in FY 2012, the Agency accomplished the following selected initiatives:

- Strengthened internal controls and maintained financial data integrity by successfully completing OMB's Circular A-123 process reviews.
- Complied with applicable laws and regulations, such as the Chief Financial Officers' Act, Federal Financial Management Improvement Act, and financial management administrative

guidelines of the Treasury Department and OMB, including the new Schedule of Spending report required for FY 2012. These efforts enabled the accurate reporting of NASA financial results.

### **Promote Effective Resource Management**

Resource management directly impacts how NASA uses its resources most effectively to deliver program results. Emphasis continues to be placed on resource management and utilization to meet growing mission demands as budget resources decrease. During FY 2012, the following selected resource management and utilization initiatives were accomplished:

- Improved the analysis of unliquidated obligation balances to improve the quality and timeliness of decisions related to the use of those funds.
- Enhanced the analysis and monitoring of financial performance to develop options and recommendations for the most efficient use of budgetary resources.
- Increased the use of less resource-intensive meeting methods, such as: teleconferencing, WebEx, and video-conferencing, rather than face-to-face venues.
- Developed a performance measurement dashboard to provide timely, consistent, and reliable performance information to enable management decisions, support accountability, and meet legislative requirements. This tool supports the performance tracking/measurement process and analysis, provides accurate and comparative performance reports that provide a standard set of core information based on NASA's strategic framework, and provides flexibility to customize reports and analysis functions based on changes to the strategic framework.
- Expanded the eBudget dataset to contain quarterly, budgetary, and key decision points (KDP) for projects' cost and schedule data. This effort enhanced the eBudget tool to provide capability for importing and viewing data through the use of ad-hoc queries.

### **Ensure the Integrity of Financial Data**

Reliable financial data supports accurate and useful financial reports that comply with applicable laws, regulations and guidance. NASA is committed to compliance with laws and regulations as well as maintaining effective internal controls. The following selected initiatives will be continued to ensure ongoing compliance and effective internal controls:

- Assessed the impact of new Treasury systems modernization initiatives, including the Government-wide Accounting (GWA) Central Accounting Reporting System and the Collection and Cash Management. These efforts positioned NASA as one of the federal agencies piloting the GWA and providing feedback to Treasury to ensure successful implementation. Currently, two NASA Centers are GWA reporters.
- Enhanced communication with trading partners for more effective monitoring and confirmation of intragovernmental balances.
- Assessed the impact of the new Government-wide Treasury Account Symbol Adjusted Trial Balance System (GTAS) reporting requirements. NASA is one of the federal agencies providing feedback to Treasury regarding the viability of GTAS data criteria. NASA implemented the system capabilities of GTAS for the beginning of FY 2013 which includes functionality to meet future regulatory requirements.



## Enhance Capabilities

Mission success, including financial management, depends on a diverse, highly skilled workforce, as well as efficient business processes. The following selected initiatives were enhanced to continue to develop the capabilities of the workforce and improve the effectiveness of NASA's business processes:

- Continued to provide training and development opportunities that strengthen critical knowledge, skills, and abilities in accounting, auditing, and financial and resources management.
- Provided opportunities for participation in external committees, such as those offered by Department of Treasury, Office of Management and Budget, and Federal Accounting Standards Advisory Board which are held to address government-wide accounting and financial management issues.
- Implemented financial system enhancements to ensure that NASA remains in compliance with federal financial management standards.
- Developed systems solutions to meet the federal mandate that small businesses be paid within 15 days of receiving an invoice regardless of the payment terms (see Presidential Memo M-11-32 dated September 14, 2011). This customization included new reports in NASA's financial system to provide success metrics on accelerated payments.
- Reviewed available electronic invoicing solutions and benchmarked with agencies currently utilizing these solutions to develop an approach for streamlining and reengineering NASA's Accounts Payable process. NASA successfully completed a pilot this fiscal year and is now finalizing the system solution to support implementation beginning in January 2013.

## Deliver a Positive Customer Experience

Financial management supports diverse internal and external customers. The following selected initiatives were emphasized to ensure continued delivery of a positive customer experience:

- Enhanced capabilities for accurate cost-tracking and accounting for customer agreements with federal and non-federal entities, and responded timely and accurately to customer inquiries.
- Prepared financial statements and reports that met the needs of internal and external customers for reliable and timely financial information.
- Enhanced analytical capabilities to support timely and accurate flow of financial information used by internal and external customers for decision making.
- Developed and communicated a comprehensive pricing policy to ensure compliant and consistent pricing based on the various types of agreements utilized to accomplish the mission of the Agency. Worked through an agency-wide team to capture process improvement opportunities for managing reimbursable activity across the Agency.
- Established a Communities of Practice framework to facilitate information sharing and benchmarking opportunities across various internal stakeholder communities.
- Improved clarity of the Agency's budget decision making processes and increased transparency of those decisions with internal stakeholders.

## Financial Highlights

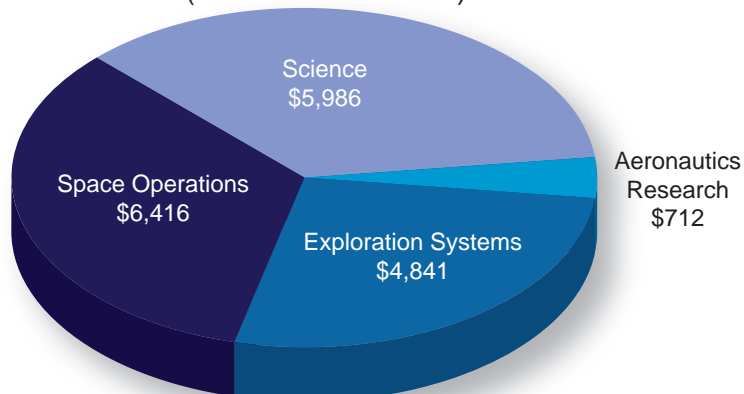
This section provides selected highlights of NASA's financial performance in the past fiscal year. The section is organized to provide a logical review of FY 2012 performance that explains the impacts of program and operational decisions and performance on financial results, where relevant and observable. Key components of this section include:

<b>Results of Operations:</b>	An overview of how NASA used its financial resources to support its programs and mission.
<b>Sources of Funding:</b>	An explanation of the type and amount of funds NASA received in FY 2012.
<b>Balance Sheet:</b>	A description of major changes in assets, liabilities and net position between FY 2012 and FY 2011.

## Results of Operations

NASA's programs and activities are carried out through four Research and Development (R&D)/Other Initiatives: Aeronautics Research, Exploration Systems, Science, and Space Operations. The Consolidated Statement of Net Cost presents NASA's net costs by R&D/Other Initiatives, which is summarized in the chart below. The net cost of operations represents the gross costs incurred by NASA, less any revenue earned for work performed for other government organizations and the public.

**Net Cost by Research and Development and Other Initiatives**  
(In Millions of Dollars)



The accompanying table provides net cost comparisons for FY 2012 and FY 2011 across the four R&D/Other Initiatives.

R&D/Other Initiatives	2012	2011	% Change
<b>Aeronautics Research</b>			
Gross Costs	\$ 821	\$ 808	2%
Less: Earned Revenue	109	119	-8%
Net Costs	712	689	3%
<b>Exploration Systems</b>			
Gross Costs	\$ 4,938	\$ 4,791	3%
Less: Earned Revenue	97	68	43%
Net Costs	4,841	4,723	2%
<b>Science</b>			
Gross Costs	\$ 7,371	\$ 7,030	5%
Less: Earned Revenue	1,385	1,019	36%
Net Costs	5,986	6,011	0%
<b>Space Operations</b>			
Gross Costs	\$ 6,899	\$ 7,253	-5%
Less: Earned Revenue	483	58	733%
Net Costs	6,416	7,195	-11%
<b>Net Cost of Operations</b>			
Total Gross Costs	\$ 20,029	\$ 19,882	1%
Less: Total Earned Revenue	2,074	1,264	64%
Total Net Cost	<b>\$ 17,955</b>	<b>\$ 18,618</b>	-4%

NASA's net cost of operations for FY 2012 was \$18.0 billion, a decrease of \$663 million, or 4% compared to FY 2011. This decrease primarily represented reduced activity in FY 2012 for the International Space Station (ISS) and Space Shuttle Program (SSP) as explained below.

**Gross costs** were \$20.0 billion, an increase of 1% from FY 2011 at the overall NASA level. The largest year-to-year changes at the mission area level were in the largest R&D/Other Initiatives, Science and Space Operations. Gross costs for Science grew by \$341 million in FY 2012, bringing its total gross costs to \$7.4 billion, the highest of the four R&D/Other Initiatives. The James Webb Space Telescope and Mars Exploration programs contributed to the increase in Science costs in FY 2012.

Space Operations experienced a reduction in gross costs of \$354 million between FY 2011 and FY 2012, primarily related to decreases in the ISS and SSP programs. NASA completed construction of the ISS in FY 2011, which reduced the costs associated with new modules and module deliveries in FY 2012. The cost of on-going support for the ISS and the experiments performed on it partially off-set the reduction in construction costs. NASA's fleet of space shuttles were retired, which reduced the cost to maintain the orbiters and support flight operations.



After flying more than 130 missions in 30 years and performing numerous science and technology activities, the NASA Space Shuttle orbiters are being retired as national treasures. Various Shuttle artifacts are permanently displayed in museums and educational institutions so that the American public can share in the history and accomplishments of NASA's Space Shuttle Program. Retirement of the Shuttles effectively removes the orbiters themselves from NASA's accounting records.

Shuttle Name	Museum	Location
Shuttle Enterprise	Intrepid Sea, Air & Space Museum	New York City, NY
Shuttle Discovery	Smithsonian's National Air & Space Museum Steven F. Udvar-Hazy Center	Chantilly, VA
Shuttle Endeavour	California Science Center	Los Angeles, CA
Shuttle Atlantis	Kennedy Space Center Visitor's Complex	Merritt Island, FL

The public will be able to view the four orbiters at various locations throughout the U.S. The facilities chosen have a legacy of preserving space artifacts and providing access to U.S. and International visitors.

Hundreds of other shuttle artifacts have been allocated to museums and educational institutions. Donation of these items also reduces the balance of NASA's property, plant and equipment account.

Artifact	Museum(s)	Location
Shuttle Simulators	Alder Planetarium	Chicago, IL
	Evergreen Aviation & Space Museum	McMinnville, OR
	Texas A&M Engineering Department	College Station, TX
Full Fuselage Trainer	Museum of Flight	Seattle, WA
Nose Cap Assembly and Crew Compartment Trainer	National Museum of the U.S. Air Force	Wright-Patterson Air Force Base, OH
Flight Deck Pilot and Commander Seats	NASA's Johnson Space Center	Houston, TX

In 2012, NASA fostered the development of commercial cargo and crew capabilities as part of the Space Operations mission area for continued support of the ISS. The Agency executed numerous mission programs through Commercial Resupply Services (CRS) contracts with various private companies for resupply missions to the ISS following the retirement of the space shuttles. These contract costs partially off-set reductions in construction costs for the ISS and depreciation costs for the donated Shuttle orbiters.

**Earned revenue** for Science increased by 36%. The increase in Science-related earned revenue was driven by an increase in reimbursable revenues related to activities with the National Oceanic and Atmospheric Administration (NOAA) on the Joint Polar Satellite Systems (JPSS) and Geostationary Operations Environmental Satellite (GOES) projects. The change in earned revenue for Space Operations was largely related to a reclassification of certain costs associated with NASA communications satellites in FY 2011.

On a **net cost** basis, Space Operations, at \$6.4 billion, remains NASA's largest R&D/Other Initiative despite a year-to-year reduction of \$779 million. This reduction in Space Operations net costs, as noted above, was largely related to lower maintenance and flight support costs in the Space Shuttle program. The Balance Sheet section of this Financial Highlights section contains more information on these changes and their impacts.

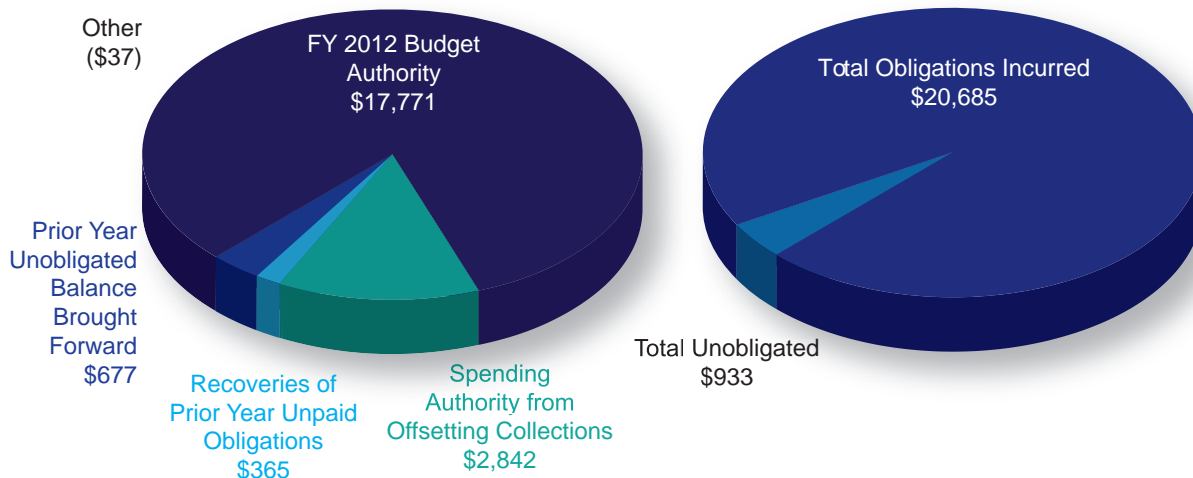


The International Space Station's Canadarm2 installs SpaceX Dragon cargo craft to the Earth facing side of the Harmony node (Credit: NASA)

## Sources of Funding

NASA received the majority of its funds to support operations through FY 2012 Congressional appropriations. The remaining funds were comprised primarily of available unobligated funds brought forward from the prior year and reimbursable agreements with other entities. Budgetary resources for FY 2012 totaled \$21.6 billion, of which \$677 million is the unobligated balance brought forward from FY 2011. The sources and uses of budgetary resources are summarized in the table below.

**NASA Budgetary Resources**  
(In Millions of Dollars)



Line Item	2012	2011	% Change
FY 2012 Budget Authority	\$ 17,771	\$ 18,449	-4%
Spending Authority from Offsetting Collections	2,842	2,031	40%
Recoveries of Prior Year Unpaid Obligations	365	257	42%
Prior Year Unobligated Balance Brought Forward	677	615	10%
Other	(37)	(36)	3%
<b>Total Budgetary Resources</b>	<b>\$ 21,618</b>	<b>\$ 21,316</b>	<b>1%</b>
Total Obligations Incurred	20,685	20,639	0%
<b>Total Unobligated</b>	<b>\$ 933</b>	<b>\$ 677</b>	<b>38%</b>

**New Budget Authority**, which is 82% of total budgetary resources for FY 2012, was provided by Congress primarily in two-year appropriations. In FY 2012, new Budget Authority decreased \$678 million from FY 2011.

**Spending Authority from Offsetting Collections** increased by \$811 million, or 40%, in FY 2012. The majority (99%) of these funds are realized reimbursable income from other Federal agencies and public entities. These organizations provide funds to NASA to leverage NASA's capabilities, including the skills and experience of the Agency's personnel and the Agency's unique physical assets. The increase in reimbursable activity is related to activities with the National Oceanic and Atmospheric Administration for the Joint Polar Satellite System Program.

**Recoveries of Prior Year Unpaid Obligations**, which increased by \$108 million, or 42% in FY 2012, are funds that were obligated in the prior year, but deobligated in the current year. The increase is primarily attributable to recoveries in the Space Operations for contracts that supported the Space Shuttle Transition and Retirement activities and the International Space Station Program.

**Prior Year Unobligated Balance Brought Forward** represents prior year funds that were not obligated and are made available for obligation in the current year. The funds in this category increased by approximately \$62 million, or 10%, in FY 2012.

**Obligations Incurred** of \$20.7 billion is the amount of available budgetary resources used in the R&D/Other Initiatives to accomplish the Agency's goals. There was no appreciable change in the amount of Obligations Incurred from FY 2011 to FY 2012.

**Other** of (\$37) million represents the amount of expired obligated and unobligated appropriation balances that are canceled as of September 30, 2012. There was no appreciable change in the amount of Other from FY 2011 to FY 2012.

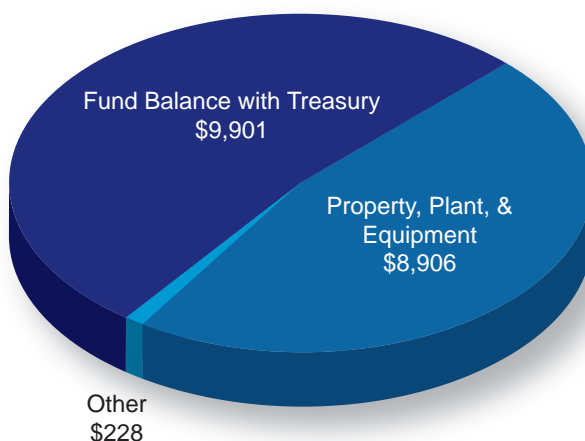


## Balance Sheet

### Assets

Total assets for FY 2012 were \$19.0 billion, a decrease of \$307 million or 2% from FY 2011. The major categories of assets are summarized in the table below.

**Assets**  
(In Millions of Dollars)



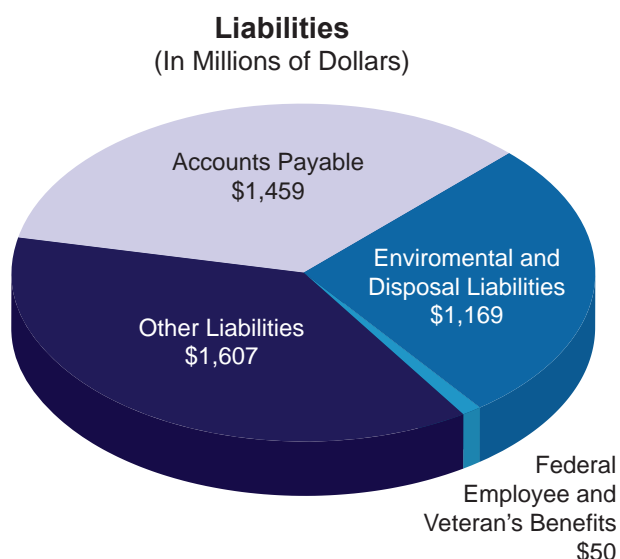
Line Item	2012	2011	% Change
Fund Balance with Treasury	\$ 9,901	\$ 9,395	5%
Property, Plant & Equipment	8,906	9,840	-9%
Other	228	107	113%
<b>Total Assets</b>	<b>\$ 19,035</b>	<b>\$ 19,342</b>	<b>-2%</b>

The largest category of assets was **Fund Balance with Treasury (FBWT)** which represents NASA's cash balance at the Department of Treasury. FBWT increased by \$506 million, or 5%, from FY 2011.

**Property, Plant and Equipment (PP&E)**, the next largest category of assets, decreased by \$934 million, or 9%, from FY 2011. Depreciation associated with the completed International Space Station was the primary contributing factor in the decrease in PP&E.

## Liabilities

Total liabilities for FY 2012 were \$4.3 billion, a decrease of \$364 million from FY 2011. The major categories of liabilities are summarized in the table below.



Line Item	2012	2011	% Change
Other Liabilities	\$ 1,607	\$ 1,623	-1%
Accounts Payable	1,459	1,530	-5%
Environmental and Disposal Liabilities	1,169	1,445	-19%
Federal Employee and Veteran's Benefits	50	51	-2%
<b>Total Liabilities</b>	<b>\$ 4,285</b>	<b>\$ 4,649</b>	<b>-8%</b>

**Other Liabilities** primarily represents an estimate of contractor costs incurred but not yet paid, as well as accrued payroll and related costs; which decreased by \$16 million.

**Accounts Payable** is the amount owed to other entities for goods and services received. It decreased by \$71 million from FY 2011. This decrease is related to the liquidation of accounts payable in multiple programs.

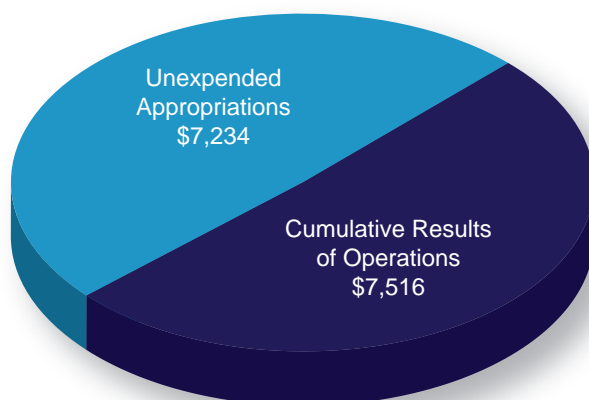
**Environmental and Disposal Liabilities** are estimates of cleanup costs for activities that create or could create public health or environmental hazard and cleanup costs associated with the removal, containment, and/or disposal of hazardous wastes. These liabilities decreased by \$276 million, or 19%, in FY 2012 largely due to a decrease in outstanding liabilities related to cleaning up the Space Shuttle orbiters. Orbiters are cleaned prior to their donation to outside organizations, resulting in a change in classification from a liability to incurred cost.

**Federal Employee and Veteran Benefits** are amounts that the Department of Labor estimates on behalf of NASA for future worker's compensation liabilities for current employees. The estimate for future worker's compensation benefits includes the expected liability for death, disability, medical and miscellaneous costs for approved compensation cases, plus a component of claims incurred but not reported. There was no appreciated change in the amount of Federal Employee and Veteran Benefits from FY 2011 to FY 2012.

## Net Position

**Net Position**, which is a summary indicator of financial condition, is the difference between assets and liabilities. It is comprised of Cumulative Results of Operations (CRO) and Unexpended Appropriations. It increased by \$57 million over FY 2011.

**Net Position**  
(In Millions of Dollars)



Line Item	2012	2011	% Change
Unexpended Appropriations	\$ 7,234	\$ 6,528	11%
Cumulative Results of Operations	7,516	8,165	-8%
<b>Total Net Position</b>	<b>\$ 14,750</b>	<b>\$ 14,693</b>	<b>0%</b>

**Unexpended Appropriations** were higher by \$706 million, or 11%, for FY 2012 as compared to FY 2011. The increase is due to higher unexpended appropriations carried forward from FY 2011. The FY 2011 Continuing Resolution limited the availability of funds to NASA programs early in the fiscal year. This caused a delay in the execution of new contracts in FY 2011, which resulted in higher unexpended appropriations at the end of FY 2011 that was carried forward to FY 2012.

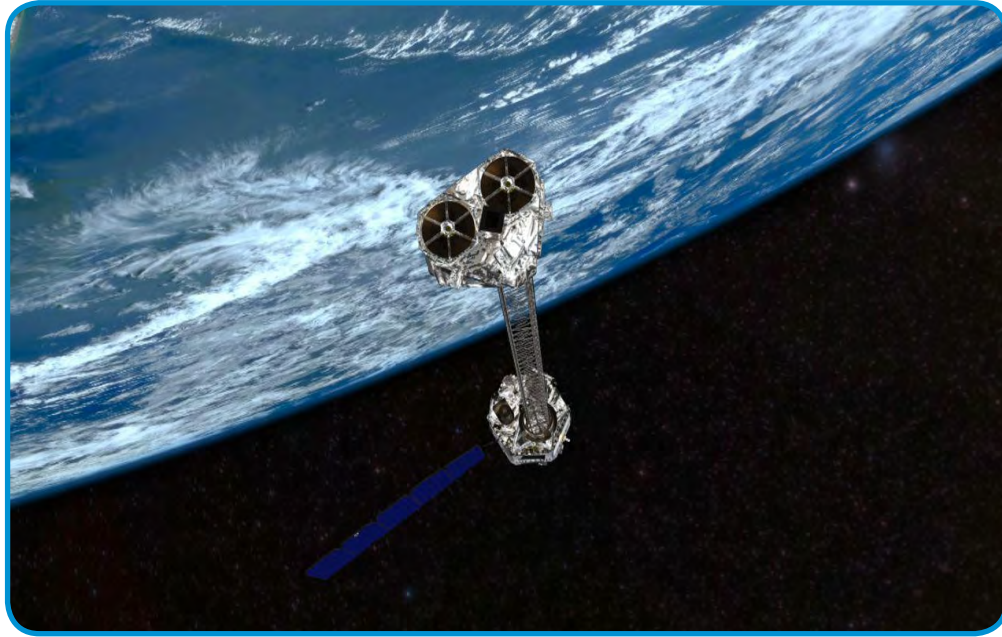
**Cumulative Results of Operations** were lower by \$649 million, or 8%, for FY 2012 as compared to FY 2011.

## Limitation of the Financial Statements

The principal statements have been prepared to report the financial position and results of operations of NASA, pursuant to the requirements of 31 U.S.C. 3515(b). While the statements have been prepared from the books and records of NASA in accordance with generally accepted accounting principles for Federal entities and the formats prescribed by the Office of Management and Budget (OMB), the statements are in addition to the financial reports used to monitor and control budgetary resources, which are prepared from the same books and records. The statements should be read with the realization that they are for a component of the U.S. Government, a sovereign entity.



# Systems, Controls, and Legal Compliance



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Photo: Artist's concept showing NASA's NuSTAR mission orbiting Earth. (Credit: NASA)

## Management Assurances

### Administrator's Statement of Assurance

February 15, 2013

NASA management is responsible for establishing and maintaining effective internal control and financial management systems that meet the objectives of the Federal Managers' Financial Integrity Act (FMFIA), the Federal Financial Management Improvement Act (FFMIA), as well as all other related laws and guidance. NASA is committed to a robust and comprehensive internal control program. We recognize that ensuring the effective, efficient, economical, and responsible use of the resources that have been provided to the Agency is not only good stewardship, but also the right approach to maximize our progress toward the realization of our mission goals. Integrity and ethical values are emphasized throughout the Agency and communicated both formally and informally through training, codification in policy, and through organizational norms and culture. As a result, managers and employees throughout the Agency are active on a daily basis in identifying or updating key control objectives, assessing risks, implementing controls or other mitigating strategies, conducting reviews, and taking corrective actions as necessary.

NASA conducted its Fiscal Year 2012 annual assessment of the effectiveness of internal controls over operations and compliance with applicable laws and regulations in accordance with FMFIA and the Office of Management and Budget (OMB) Circular A-123, Management's Responsibility for Internal Control. Based on the results of this evaluation, NASA can provide reasonable assurance that its internal controls over the effectiveness and efficiency of operations and compliance with applicable laws and regulations as of September 30, 2012, were operating effectively and no material weaknesses were found in the design or operation of the internal controls.

In addition, NASA's Office of the Chief Financial Officer performed an assessment of the effectiveness of internal controls over financial reporting in compliance with OMB Circular A-123, Appendix A-Internal Control over Financial Reporting. Based on the results of the evaluation, there were no material weaknesses identified in the design or operation of these controls. NASA provides reasonable assurance that internal controls over financial reporting are operating effectively, as of June 30, 2012. Finally, in accordance with the requirements of the FFMIA, we assessed the implementation and maintenance of NASA financial management systems. We found that these substantially comply with federal financial management systems requirements, applicable federal accounting standards, and the U.S. Government Standard General Ledger at the transaction level.

In conclusion, NASA makes an “unqualified statement of assurance” that its internal controls for FY 2012 were operating effectively.

NASA will continue its commitment to ensuring a sound system of internal control exists over operations, reporting and financial systems and will continue to monitor and enhance its quality assurance activities.

A handwritten signature in dark ink, appearing to read 'C. Bolden, Jr.', with a long horizontal stroke extending to the right.

Charles F. Bolden, Jr.  
Administrator

## Financial Systems Strategies

SAP Core Financial (CF) serves as NASA's financial accounting system of record and is the foundation for NASA's business systems providing the core accounting functionality. Since its initial implementation, CF has been enhanced and expanded to demonstrate measurable progress toward achieving compliance with Federal Managers' Financial Integrity Act (FMFIA) and Federal Financial Management Improvement Act (FFMIA), and an unqualified financial audit opinion. CF includes the standard SAP modules of funds distribution, cost management, accounts payable, accounts receivable, purchasing, asset accounting, and standard general ledger. In addition, NASA's CF integrates with the Agency's FedTraveler system, an eGov initiative providing agency-wide travel processing. Lastly, NASA's Contract Management Module (CMM) / PRISM is used as a hub to modernize/standardize NASA's contract writing. It provides an integrated agency-wide procurement solution that interfaces with CF and promotes NASA's internal initiatives to optimize business operations. These systems, along with others, such as Business Warehouse/Cognos, eBudget, Metadata Manager and Bankcard all define the NASA Financial Management System investment.

There were no major Development/Maintenance/Enhancement (DME) projects during FY 2012; however, an eTravel-2 DME project is slated to begin in FY 2013. eTravel-2 will improve the end user travel experience and better position NASA to comply with requirements by the Federal Travel Regulation (FTR) for civilian Federal Government Travel. In FY 2013, NASA will also implement SAP's Governance Risk Compliance (GRC) toolset to improve access control and transaction logging capabilities across the enterprise solution set.

NASA's Financial Management System is an agency-wide solution for all Centers and installations. Since 2003 the CF System has served as NASA's financial accounting system of record and is the foundation of NASA's ability to achieve its financial management objectives and management of the budget. During November 2006 NASA implemented a major update to CF in addition to the implementation of the CMM/PRISM solution. A further contribution to Enterprise Architecture improvements came with NASA's FedTraveler solution during 2009.

These system strategies allow NASA to effectively manage enterprise data and information per the Agency's vision for Enterprise Architecture. The CF System assists NASA in achieving its Enterprise Architecture target state goal of reducing duplicative systems and providing cost-effective and reliable applications to support NASA's mission.



# Looking Forward



Artist's concept of NASA's Space Launch System initial crew vehicle launching from the Kennedy Space Center.  
(Credit: NASA)

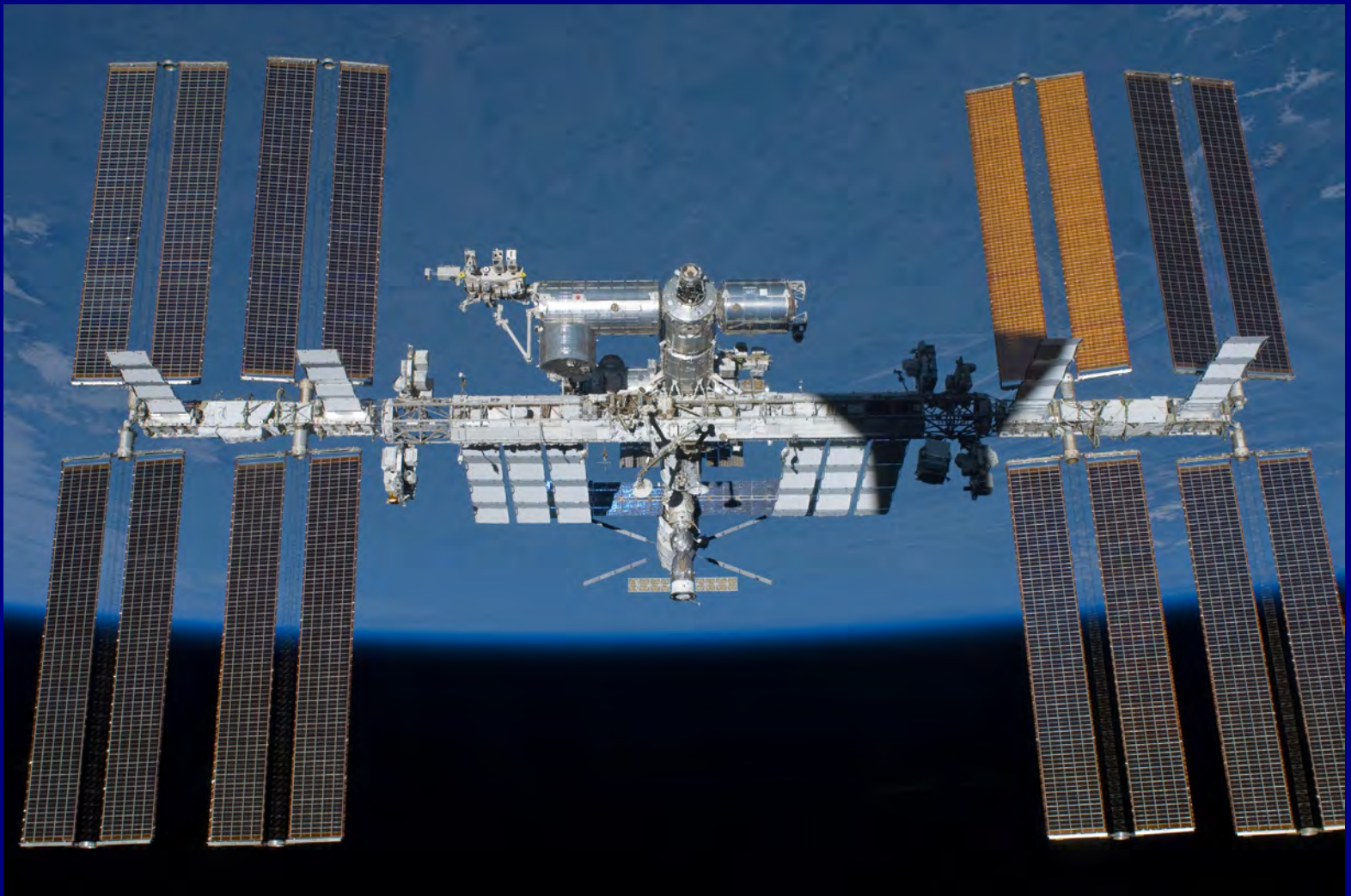
## Looking Forward

In fiscal year 2013, NASA will build on the successes achieved across 2012, as we continue evolving the Agency's space program. NASA and the Nation are embarking upon an ambitious exploration program that will incorporate new technologies and leverage proven capabilities, as we expand our reach out into the solar system. Successes such as the landing of the Curiosity Rover on Mars and the first demonstration of a resupply mission by a commercial provider, create a strong foundation for future endeavors. As the coming year unfolds, NASA will continue to conduct important research on the International Space Station, which continues to yield scientific benefits and provide key information about how humans may live and thrive in the harsh environment of space. Foundational to this research is the capability to bring supplies and crew to orbit, which will be enhanced in 2013 through more flights that deliver cargo from the commercial providers.

NASA will emphasize the work and contributions to the Nation that are realized from its scientific endeavors. After three years of preparation, the Landsat Data Continuity Mission will launch, and NASA will continue to make strides in the development of other key science missions such as the Global Precipitation Measurement Mission and the Mars Atmosphere and Volatile Evolution Mission. Development of the James Webb Space Telescope remains steadily on its new path, and is rapidly moving toward its completion and launch, planned in 2018. The Solar Dynamics Observatory, which launched on February 11, 2010, is expected to complete its prime science measurements, and bring back key findings about the Sun's dynamic processes. And on the Astrophysics front, the Fermi Gamma-ray Space Telescope, launched in 2008, will also finish its primary mission objectives; since the telescope's inception it has monitored more than a thousand galaxies.

NASA expects its innovative technology development to serve the Nation by underpinning future spacecraft advancements, supporting life in space, and enabling the next generation air transportation system. In 2013, NASA will make progress on concept developments, small satellite missions and technology demonstrators. As current and future work results in new capabilities, knowledge, and technologies, it is a core part of NASA's mission to share these advances with the Nation. Through this access, entrepreneurs, industry, academia, and other government agencies are encouraged to innovate in ways that can help address national and global needs and challenges. NASA will remain committed to addressing increased interest in science, technology, engineering, and mathematics (STEM) education, the Nation's economic vitality, and stewardship of Earth.

This is an exciting time for NASA—a time of opportunities to shape a promising future for the Nation's space program. As a foundational component of this journey, NASA will continue to focus on fiscal responsibility and long term affordability, and address any management challenge or risks that may pose a roadblock to future success. At the same time, incredible challenges lie ahead given the economic and fiscal environment in the United States. NASA will do its part to step up to these challenges through the effective and efficient use of the resources entrusted to the Agency.







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